People & the Planet

IPPF, IUCN, UNFPA, WWF

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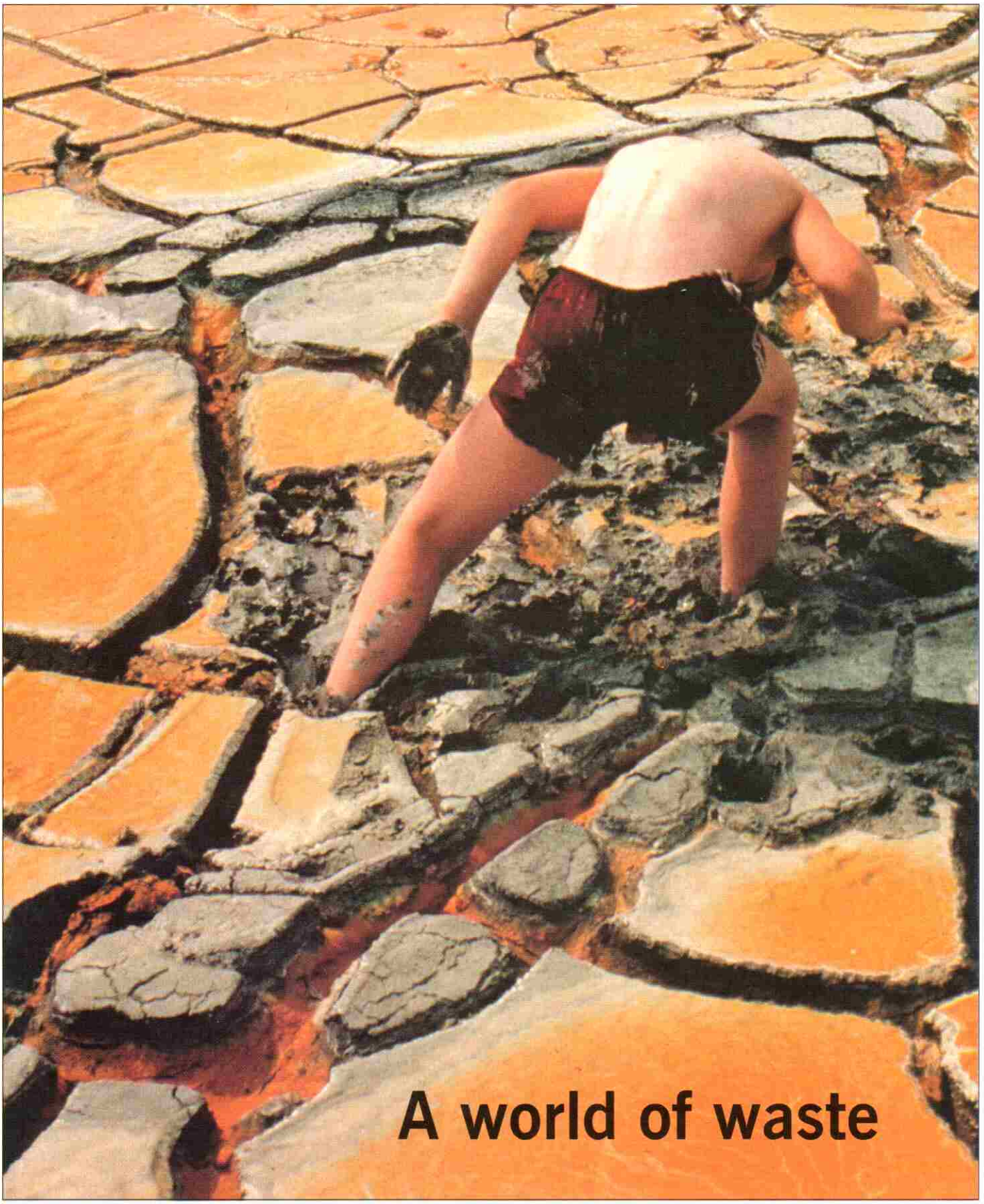

A world of waste

DAVID DRAN/STILL PICTURES

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Front cover: *A child plays in polluted waste from a copper mine in Eleshnitsa, Bulgaria.*
JECKO VASSILEV/STILL PICTURES

Left: *Seagulls scavenge over a landfill site in Warrington, UK.*
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People & the Planet

The revolution to come

Adam Markham, in his recent book *A Brief History of Pollution** reminds us that the ill effects of waste and pollution are by no means new. From the Neolithic miners of Central Europe, dying of silicosis, to the citizens of Rome, poisoned by lead pipes, to the medieval plagues and the horrors of the industrial revolution human activities and crowded settlements have led to polluted air, soil and water. But, as contributors to this issue of the magazine make clear, human society today is wasting and polluting our small planet on a scale our ancestors could not have imagined.

In this century, the use of virgin raw materials has multiplied 17 times. Mining now moves 8 billion tons of earth a year, more soil than nature carries to the sea in all its rivers. In just 20 years, the amount of hazardous and toxic waste in the United States has increased from 9 million tons a year to 238 million tons. Within a generation China, following fast in the footsteps of a Northern world that can no longer find space for all its dangerous wastes, will be top of the league in the production of greenhouse gases.

And yet, as one digests the terrifying truth about a crowded world in which the avalanche of poisonous waste could overwhelm us long before resources themselves run out, there is a more hopeful message. There are signs that a revolution in materials economy, energy saving and waste recycling and re-use is already gathering pace. The rich OECD countries now use a quarter less energy than in the early 1970s. According to John Elkington, business is moving from awareness to action in environmental enterprise, with huge opportunities opening up.

In poor countries too there are examples of positive action. We report from Calcutta where poverty and sunshine have spurred local people to transform the city's sewage into healthy fish and vegetables. It is a system that can be copied wherever similar circumstances occur. In Cairo too, a positive approach to rubbish is not only recycling waste, but empowering women. In Sri Lanka we tell the story of the Buddhist and the durable car, that does not have to be thrown away. These are signs of hope. But as Peter Timmerman concludes, the real revolution in our attitude to the material world has yet to take hold – in the human mind.

John Rowley

*Earthscan, London, 1994, £9.95.

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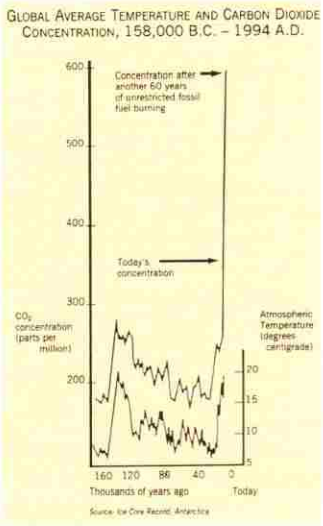
NEWS FILE

Change in climate

The world's climate is at serious risk, says a new report by the Intergovernmental Panel on Climate Change, conducted by an international network of leading scientists and technical experts.

The report concludes that the scientific basis for global warming established in the 1990 First Assessment Report, still holds.



After re-analysing the relative importance of various greenhouse gases, the IPCC has revised upward the warming effect of methane. Methane is released by garbage dumps, cattle, leaks in gas pipelines, and rice paddies.

The report also found that although the upward trend in carbon dioxide and methane emissions decreased from 1991 to mid-1993, by late 1993, carbon dioxide emissions had increased again. More importantly, the report shows that because carbon dioxide remains in the atmosphere for a long time, even if global emissions of carbon dioxide could be stabilized, concentrations would continue to rise for at least 200 years.

To stabilize atmospheric concentrations of carbon dioxide at twice present-day levels would require humanity's future emissions to drop below 1990 levels.

The second assessment report will be published in late 1995.

■ *For more information, contact Michael Williams on +41-22 979 9242, fax 797 3464, Email MWilliams@unep.ch.*

Ozone on the mend

International efforts to reduce the impact of ozone-depleting substances are having their desired effect, according to a report by 226 of the world's leading atmospheric science experts.

However, in spite of measures taken which will gradually improve the state of the ozone layer during the next century, the ozone layer's most vulnerable period still lies ahead.

A key finding of the 1994 Assessment shows that the build-up of CFCs and halons has slowed in recent years as a result of international intervention to reduce emissions of these harmful compounds. If recommendations under the Montreal Protocol are continued this "should eventually eliminate ozone depletion."

Secondly, the report states that the ozone layer will be most "affected by human-influenced perturbations and most susceptible to depletion around the year 1998." After which, the levels of ozone-depleting substances such as chlorine and bromine are expected to slowly decrease. As a result, the ozone layer is "expected to recover in about 50 years in response to planned international actions."

Parties to the Montreal Protocol will base their future decisions regarding the protection of the stratospheric ozone layer on the 1994 Scientific Assessment and on previous assessments on environmental and health effects of ozone layer depletion.

■ *For more information, contact Mr K M Sharma, Co-ordinator Ozone Secretariat, UNEP, PO Box 30552, Nairobi, Kenya. Tel: +254-2 62-3885 or Fax: 521930. Or Dr Rumen D Bojkov, World Meteorological Organization, 41 Giuseppe Motta, Case Postale 2300, CH-1211 Geneva. Tel: +41-22 730-8455 or Fax (41-22) 740-0984.*

Tobacco smoke blows south

A million people in the South are dying each year from smoking-related diseases and the figure is projected to reach 7 million in the next 30 years, according to a new report issued by the Panos Institute, *Tobacco: The Smoke Blows South.* Half of all men and 8 per cent of women in the developing world now smoke.

The report, launched to coincide with the 9th World Conference on Tobacco or Health last October, challenges the common assumption that tobacco is an important source of foreign exchange for many developing countries. By making already poor people poorer by worsening their health, tobacco production is increasingly being seen as "fool's gold."

Most developing countries which grow tobacco do not export the crop. Around 80 per cent of tobacco is used for domestic consumption in the South. Among the 43 exporting countries, "only Malawi and Zimbabwe earn more than 2.2 per cent of foreign earnings from tobacco," say John Madeley, author of the report.

Tobacco nursery, Zimbabwe.

ALEX OLAH/ENVIRONMENTAL PICTURE LIBRARY

More importantly, the report states that any financial gain incurred by growing tobacco is negated by the more damaging effects of the crop to both health and the environment. Already tight health care resources in the South will be further stretched by the increased numbers of people developing smoking-related diseases such as lung cancer, heart disease and chronic bronchitis.

Land dedicated to tobacco is at risk of deforestation and soil erosion. In Uganda, widespread deforestation and soil erosion has resulted from burning wood to cure the tobacco leaf. Tobacco growing also depletes soil nutrients faster than any other crop. High levels of pesticides and fertilizers are used in the process which can affect local water supplies.

Anti-tobacco campaigners stress the alternatives to tobacco. As world prices in tobacco fall, crops such as sugar cane, maize, bananas and coconuts which can be grown on the same land, make a more attractive financial option.

■ *For further information and a copy of the report,* Tobacco: The Smoke Blows South, *contact Catherine Sayers or Juliet Heller, Panos press office, Tel: +44-171 278 1111.*

Limits of the sea

The global fish catch is failing to keep up with population growth. Declining catches have already cost

more than 100,000 jobs in the last few years among the world's 15 to 21 million fishers. Low-income consumers, dependent on fish for animal protein, are losing access to fish supplies as costs rise and affluent markets take priority.

Peter Weber, in a comprehensive study for the Worldwatch Institute, believes there is still time to reverse these trends but only if governments and the international community act fast to allow over-fished stocks to recuperate and sustainable, community-based management practices to be put in place.

Over-fishing is the biggest threat to fisheries overall, but wasteful fishing practices are also to blame. The use of deep sea dragnets held down with chains, for example, disturbs the seabed, destroys the food supplies needed to sustain the fish, robs the sea of useful but unwanted species and wreaks havoc on entire ecosystems. When pollution and habitat destruction are added, the recipe for disaster is obvious.

Development has destroyed an estimated 50 per cent of all coastal wetlands, up to 10 per cent of coral reefs and caused untold damage to bays, estuaries and river systems. Pollution can make fish toxic and thus harmful to humans.

Too many people are fishing in too many boats, Weber concludes, quoting FAO data; the fishing fleets are too large and their modern technologies are too destructive. Government subsidies fuel this over capacity. The victims are millions of small coastal fishermen in developing countries whose jobs are at risk and whose communities are consequently threatened with malnutrition.

To match population growth, the total world supplies of fish would have to rise from today's 100 million tons a year to 120 million tons by 2010 and another 20 million tons annually by 2025 to maintain today's per capita fish supply.

The crisis anticipated when the negotiations on a Law of the Sea were initiated 20 years ago has now arrived, Weber concludes, although the Law only came finally into force last November. He describes the policy of exclusive economic zones (EEZs) established under the Law as a compromise which solves some conflicts but exacerbates others and ends the concept of freedom of the seas. A comprehensive oceans policy is needed in which the fishers themselves participate.

■ Net Loss: Fish, Jobs and the Marine Environment. *Worldwatch Paper No. 120. Worldwatch Institute, Washington DC.*

Axe murder

In an effort to halt the continuous chipping of forests and plundering of fish stocks, 15 South Pacific leaders met for the summer summit of the South Pacific Forum to take collective action to preserve their countries' natural resources.

At the Forum, government leaders pledged to monitor and control logging and fishing activities of foreign companies and to implement standards to manage their resources sustainably. Paul Keating, the Australian Prime Minister denounced the activities of foreign logging companies as "environmental piracy."

The small island states of the South Pacific have become easy prey for exploitation by their wealthier East Asian neighbours. Japan and Korea are responsible for up to 90 per cent of timber exported from the Solomons. If logging continues at its present rate, it is estimated by Rainforest Action Network, that all viable forests in the Solomon Islands will disappear within 8 to 15 years. The picture is also

Papua New Guinea's forests are under threat.

bleak for the forests of Papua New Guinea and Melanesia.

In response to the eco-crisis in his country, Frances Hilly, Prime Minister of the Solomon Islands has announced a moratorium on new foreign and local logging licences.

According to an official Australian report issued at the summit, some Pacific countries were losing around half of their national incomes through unmonitored, undeclared and under-priced logging exports. In one case, Solomon Island landowners were paid $US2.70 per cubic metre of logs which were then resold on the open market for $US350 a cubic metre.

The tale is equally grim for the Island States' fisheries which account for 40 per cent of the world's catch. From a catch worth $US1.5 billion, the returns to the island countries are less than $US50 million.

Dioxin threat

"Dioxins are a long-term investment in abnormal behaviour" warned Professor Claude Hughes, from Duke University, North Carolina, at the launch in London of a comprehensive three-year study on dioxin emissions by the US Environmental Protection Agency (EPA).

Professor Hughes, a leading scientist in the research team, outlined why there are no safe limits of dioxins.

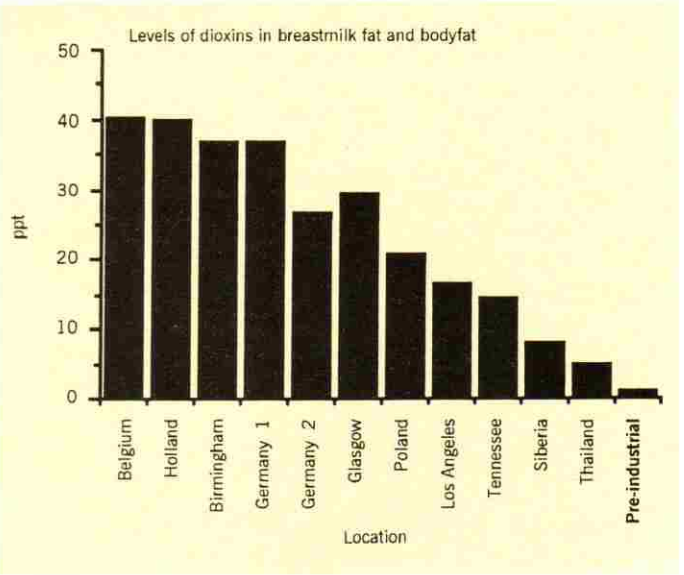
Even at low exposure levels, there is now strong evidence that dioxins are a potential cause of a whole host of illnesses. As well as being carcinogenic, dioxins attack the immune system and affect the body's natural hormonal and reproductive systems. Resulting problems include, falling sperm count in men, female infertility, birth defects and diabetes.

In Britain and worldwide, dioxins are released into the environment every day by industrial incinerators and chemical plants and are by-products of industrial processes involving chlorinated chemicals. People are exposed to dioxins through food contaminated by airborne dioxin particles which settle on fields where animals feed. The general population receives over 90 per cent of its dioxin intake through diet. Indeed, animal fat is the major source of dioxins for humans.

The US EPA report calls into question the present UK Government's dioxin safety limits. The US EPA has proposed new legislation for Americans under the Clean Air Program to reduce dioxin emissions by 90 per cent from a variety of combustion sources. Greenpeace is calling for the UK Government to adopt "phase-out policies for dioxins and related chemicals."

UK dioxin expert, Ruth Stringer, Honorary Research Fellow at the University of Exeter, believes an over-arching strategy is needed to reduce human exposure. "The persistence of dioxin means that even if emissions were stopped now, levels in food could take years to fall significantly."

■ *For further information contact the Dioxin Team at the Greenpeace Press Office on : +44-171 359 4837/354 5100 or at Friends of the Earth Scotland on: +44-131 554 9977.*



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A world of waste

Any theory of development must look not only at the beginning of the process – the limits imposed by availability of resources and the numbers of people needing them – but also at the end – the limits determined by the amount of waste produced, says *Ken Gourlay*, in this global survey of the problem.

Waste is more easily recognized than defined. To individuals in Western society, the leftover blobs of mustard on the rim of a dinner plate, like chicken bones or unchewable bits of gristle, is regarded as 'waste' and disposed of in the 'waste bin', while, on completing the digestive process, our bodies emit waste matter that is flushed into the local sanitary system.

On our journeys to work our cars, buses and lorries emit waste fumes into the dust laden air of our cities, and in our offices the daily consignment of junk mail, 40 per cent of which, in the United States at least, is never opened, ends up in the 'waste paper' basket.

Throughout the day our industries, and the power stations on which they depend for energy, discharge waste effluent into streams, rivers or the sea and waste emissions into the air. Our farmers, using intensive methods of cultivation to maximize product and profits, douse their vast fields with chemical fertilizers that are 'wasted' when they leach beyond the intended soil, or spray their crops with synthetic pesticides in such quantities that some are invariably carried away by the wind and wasted.

As the first generation of Magnox nuclear reactors reaches the end of its working life, we can no longer escape the problem of radioactive waste that will remain a hazard into the next century; and, having seen how discharges of gases into the atmosphere have caused acid rain, with subsequent death of trees and blight of buildings, we now contemplate with increasing unease the prospect that continued discharge of greenhouse gases will bring about climatic change in which the polar ice-caps will melt, Pacific islands disappear beneath the waves and our children and grandchildren be forced to live in ways that are yet unknown.

The problem

Every day the 7.5 million inhabitants of New York City throw away approximately 26,000 tons of solid waste – more than any other city in the world. The 12,000 tons from residential and institutional sectors is taken by truck and barge to the Fresh Kills landfill in Staten Island – at 2,900 acres, the world's largest. At the end of its life in 10-20 years, it will consist of four pyramids of up to 435 feet high and become the highest point on the coast between Maine and the tip of Florida. When all the space is used up, the inhabitants of New York will have nowhere to put three-quarters of their rubbish.

MARK EDWARDS/STILL PICTURES

It is not, however, the production of domestic and municipal waste that causes the greatest concern in the North so much as that of hazardous waste from industry, particularly the chemical industry. In the United States alone, the total amount of hazardous and toxic waste has leapt from nine million tons a year in 1970 to 238 million tons in 1990. The North has now reached the stage where it produces more waste than it has the means to dispose of within its own territory.

A logical solution

In December 1991, the former Chief Economist of the World Bank, Lawrence Summers, was reported saying: "I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable and we should face up to the fact that....underpopulated countries such as Africa are vastly underpolluted."

In practice, the Summers' invitation to use Africa as a dumping ground for Northern waste was outdated. By the end of the 1980s the public were already familiar with the spectacle of 'plague ships' such as the *Khian Sea, Zanoobia,* or *Karen B*, carrying unwanted cargoes of toxic waste from the United States or Europe to Africa – and eventually back again.

Meanwhile, a worldwide effort under the auspices of the United Nations Environment Programme (UNEP) to stem the waste trade led, in March 1989, to 118 nations signing the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal.

Use of the word 'control' rather than the word 'prevention' or 'prohibition' was significant. It left the door open in developing countries for regulating authorities to make difficult choices between poverty and poison.

In December 1992, signatories of the Convention meeting in Uruguay, faced an outright demand for a full ban but eventually reached a compromise by which exports for *final* disposal would cease, but exports for *recycling* could continue until the issue was reviewed.

The result has been a sharp increase in 'recycling' waste. In practice, this has meant either that waste imported under this category is just dumped in the open countryside or that waste is recovered, the real profits coming from the waste which is directly dumped. In an attempt to circumvent the ban on hazardous waste exporting, no less than 90 per cent of waste trade schemes in 1993 claimed some 'further use' or 'recycling' potential.

Nor did the Basel Convention halt the overall basic waste trade. Since 1989, there have been more than 500 attempts to export over 200 million tons of waste from 24 countries of the OECD to 122 non-OECD countries, with Germany, the world's largest exporter of waste, increasing its exports every year since 1988.

DORREBOOM/GREENPEACE

Above: *Making a pyramid of waste in New York's Fresh Kills landfill.*
Right: *Cargo of toxic waste on the Dutch ship Oosteeze, damaged in the North Sea en route from the former Soviet Union.*

At the same time there has been a change in the areas involved. Between 1986-91, dumping was targeted on Africa, the Caribbean, Latin America and the Pacific; today the choice is for Asia, Eastern and Central Europe and the former Soviet Union.

The clean-up gimmick

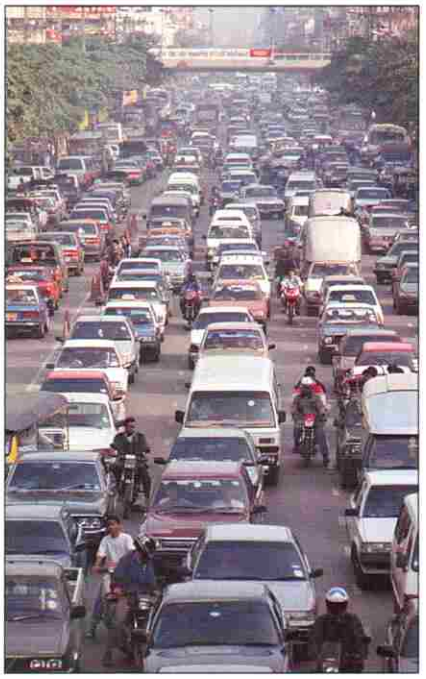
Industry has responded to increased regulatory control of toxic waste by lobbying for the regulation of disposal rather than production. The result has been the growth of the waste treatment industry into a global giant, concentrating on clean-up and control rather than prevention and process innovation. Hence, a new 'environment industry' broadly divided between the Japanese (air pollution control) the EU (water) and the United States (which in 1992 controlled 40 per cent of the world market, with a revenue of $86 billion).

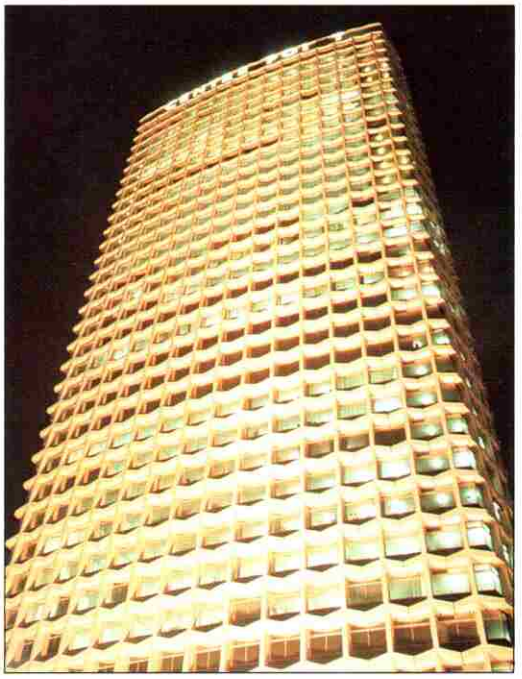
Events in the South followed three-stages: first came the import of the less desirable toxic waste-making industries from the North. An example was, expanded chlorine production by companies such as Dow Chemicals, Solvay and ICI in countries such as Brazil, Saudi Arabia, Egypt, Thailand, India, Taiwan, and China. The worst example was, probably, the *maquiladoras* of the Mexico-US border. These free-trade zones allowed transnational companies to set up thousands of plants to take advantage of low wages and lax health and safety compliance.

Excesses in this 'development' led, as in the North, to 'regulation', mainly on the lines developed in the North. Thus the Asian Development Bank now estimates that the Asia-Pacific region will need between $12 billion and $70 billion a year to mitigate damage caused by economic development. Hong Kong, Taiwan and South Korea, for example, plan to spend $5 billion over the next five years to develop municipal and industrial waste management systems.

In the third stage, developing countries have begun to import 'Environmental' technology and services to meet the regulations which earlier polluting imports made necessary. This time virtue and technology go hand in hand. As Ron Brown, US Secretary of Commerce, put it succinctly in June 1993: "The more pressure that we put on ourselves, on Mexico, and on every place in the world to do something about the environment, the more they're going to reach out for environmental technology. And where are they going to get it? They're going to get from us!"

VISSER/GREENPEACE

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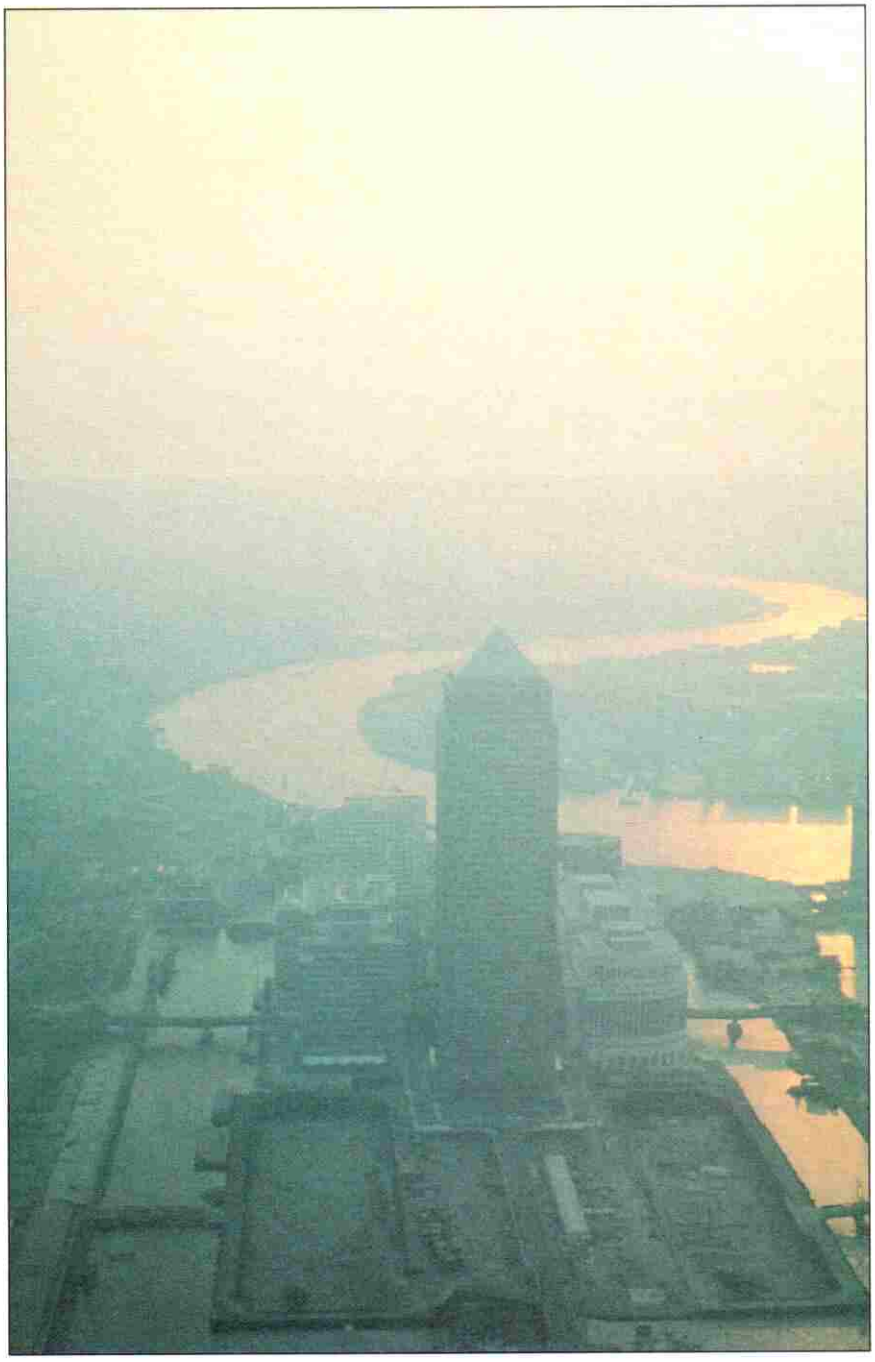
B & C ALEXANDER/STILL PICTURES

Hence the hundreds of millions of dollars acquired by Mexico from foreign governments and multilateral development banks to finance the installation of hazardous waste dumps, incinerators, air pollution control devices and water treatment facilities in the US border area, even if the waste dumps are of dubious value and incineration now out of favour in the North.

The deeper malady

Ultimately industry's solution is no solution – it merely enables multinational corporations to retain control of the process while transferring the 'pollution problem' from North to South. This is the inevitable logic of



SUE CUNNINGHAM/PANOS PICTURES

Above left: *Delivering bottled water to Maquiladora community, Mexico, where local supplies are contaminated.*
Below left: *Traffic in Bangkok.*
Middle above: *Empty offices lit up at night in London.*
Middle below: *Sewage in an Arctic settlement being emptied into a lagoon.*
Above: *Smog over Canary Wharf, London.*

diverting attention to regulating the disposal of waste rather than asking why it should be produced in the first place. The real problem is not the *disposal* of waste but its *production*.

Everyone now knows that CFCs, as propellants in aerosols or coolants in refrigerators, are responsible for the waste gas that is destroying the ozone layer and contributing to the Greenhouse Effect. Yet China plans to increase production to ten times its present level in order to provide refrigerators for its growing population, and who is to dispute China's right to do so?

The only way out of this dilemma is, apparently, to find some form of CFC substitute – the hydrochlorofluorocarbons (HCFCs) recommended by ICI or Du Pont – that are less dangerous. Unfortunately, these turn out to be too expensive for many southern countries and not as harmless as supposed. Meanwhile, independent research has solved the problem by showing that the work can be done by using small amounts of propane gas and dispensing completely with the chlorine element.

But even this does not solve the real problem: the vast pressure on energy and other natural resources to produce more and more refrigerators, in processes which generate more and more waste. The fact is that the greater part of waste arises because it is in an inevitable by-product of our current mode of living. Modern production and services in the so-called developed world are geared to satisfying the requirements of a contemporary consumerist society, where demands include a house (with a holiday home elsewhere), a car (preferably two), television set, video, washing machine, and other 'consumer durables' with all their inevitable attributes.

More cars, for example, mean more roads. Thus in July 1992, the EU Commissioner for Roads published a document proposing up to 12,000 kilometres of new motorways across Europe by the year 2002, an increase of almost 50 per cent in the present network. At the same time, because of increased exhaust fumes from traffic, air pollution through smog becomes one of the greatest dangers in cities such as Athens, New York, or Los Angeles. According to a UNEP-WHO report, 15-20 per cent of urban residents of North America and Europe are now exposed to unacceptable levels of nitrogen dioxide and 50 per cent to carbon monoxide.

Yet it is this pattern of development – a market-dominated scheme for producing material goods – that is proposed as the model for the South to copy and which the developing world, with the enticing miracles of contemporary 'advanced' civilization displayed before it, is only too willing to adopt.

But if the North cannot cope with the waste it produces to maintain its affluent life-style except by exporting it to the South, what chance is there for the South to follow the same path? And, on what moral grounds, can they be deprived of the opportunity? A more equal distribution of resources and responsibilities will, however, have one primary implication – that the inhabitants of the North accept a change in the way in which they live, in particular, that they must use less wasteful methods of production and consumption. ■

Ken Gourlay courageously completed this article shortly before his death from cancer in November. He is author of World of Waste, *Zed Press, London, 1992.*

Towards a new culture of consumption

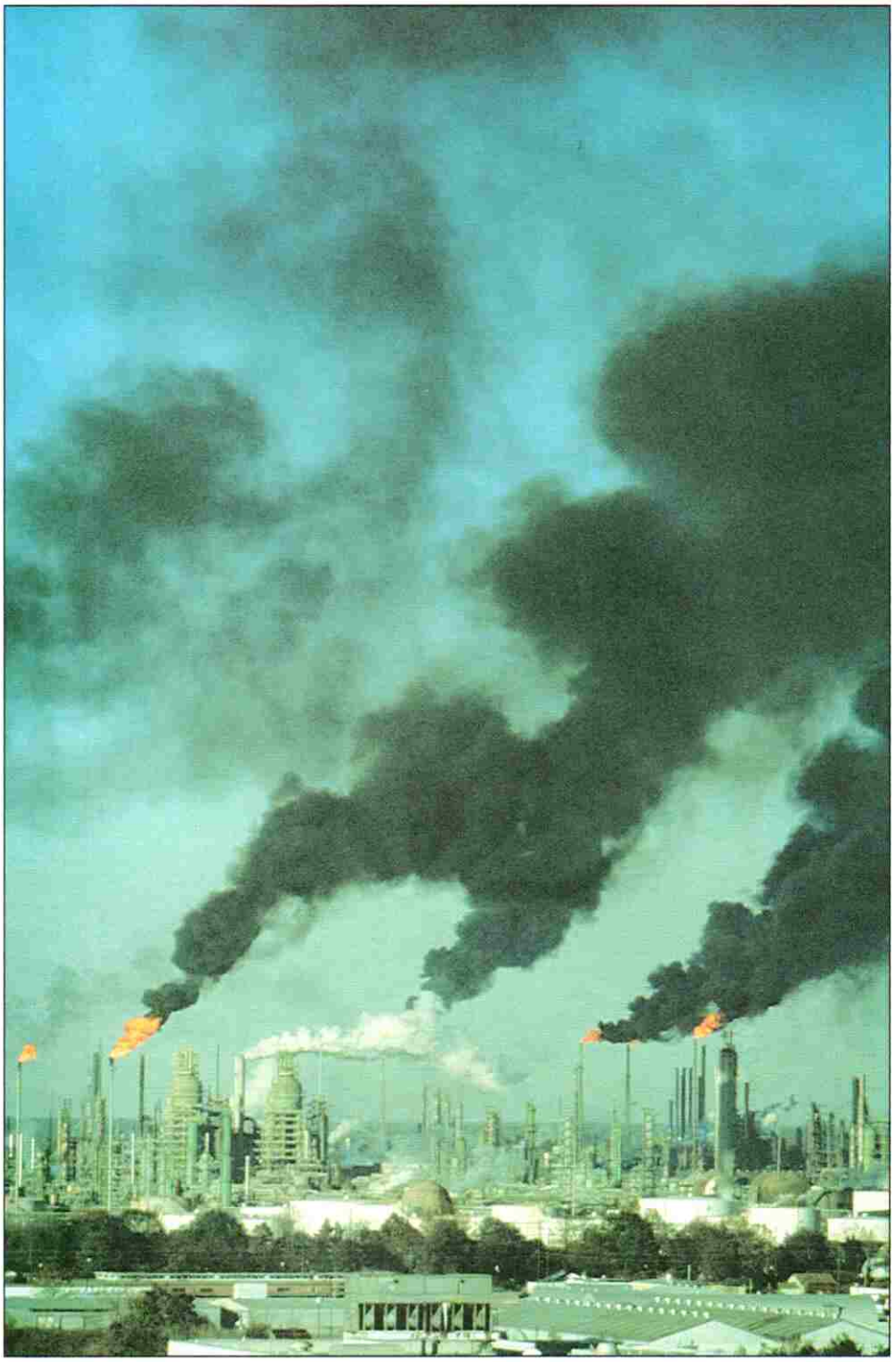
A radical change is needed in the way we think about the raw materials used to fuel our consumer society, says *John Young* in the first of two articles.

The culture of consumption that has spread since mid-century from North America to Western Europe, Japan, and a wealthy few in developing countries has brought with it an unprecedented appetite for physical goods – and the materials from which they are made. The residents of industrial societies are voracious consumers, using many times their weight in chemicals, metals, paper, and other materials each year.

Added up, the quantities are staggering: in the United States, the average person accounts for the use of some 540 tons of construction materials, 18 tons of paper, 23 tons of wood, 16 tons of metals, and 32 tons of organic chemicals in the course of a lifetime. By the standards of the developing world, that's an extravagant level of consumption. People in industrial countries account for only about 20 per cent of global population, yet they consume 86 per cent of the world's aluminium, 81 per cent of its paper, 80 per cent of its iron and steel, and 76 per cent of its timber.

These extraordinary consumption rates have enormous environmental consequences, but the materials themselves usually slip unnoticed through our lives. The only time we are likely to notice the large quantities of materials in our lives is when they become waste and we are compelled to get rid of them.

Unfortunately, the environmental costs of materials are not just a matter of waste. Groundwater pollution from landfills or toxic incinerator emissions are actually a relatively small part of the problem, since most of the damage is done well before waste management even becomes an issue. Far more environmental havoc stems from the immense but rarely noticed global complex of mines, smelters, petroleum refineries, chemical plants, logging operations, and pulp mills that extract and process virgin materials.



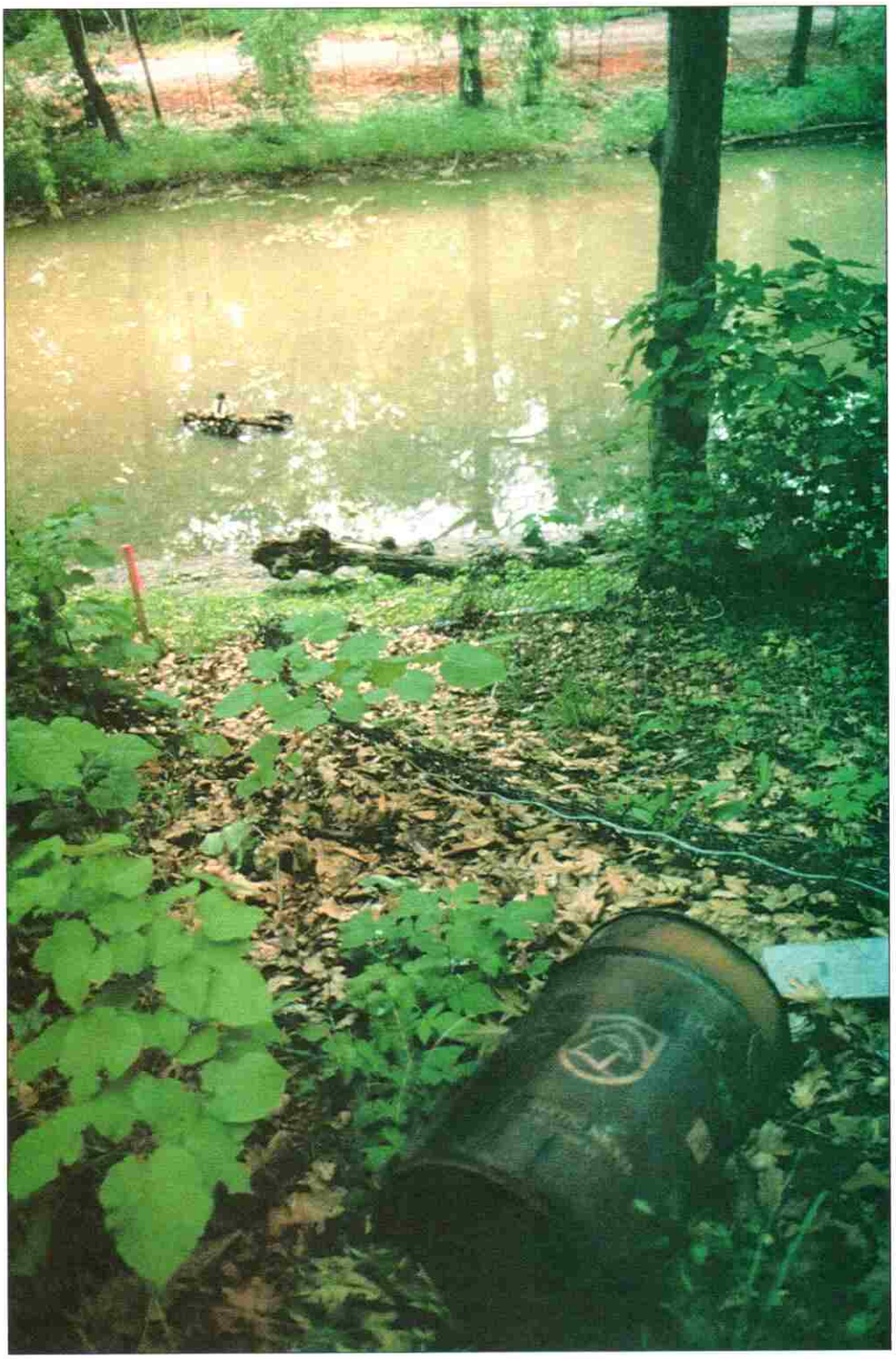
SAM KITTNER/PANOS PICTURES

LISA BUNIN/GREENPEACE

Above and below: *Local communities were evacuated after contamination of Love Canal, New York State.*
Left: *Chemical refinery in Baton Rouge, Louisiana.*

Sophisticated technologies have let these extractive industries produce vast quantities of raw materials, and have helped keep most materials prices in decline. But the growing scale of those activities has also exacted an ever-increasing cost: raw materials production has brought about unparalleled ecological destruction during the last half-century.

Today, mining moves more soil and rock – an estimated 28 billion tons per year – than is carried to the seas by the world's rivers. Cutting wood for materials plays a major role in global deforestation, which has accelerated dramatically in recent decades. Since 1950, nearly a fifth of the earth's forested area has been cleared, and industrial logging has more than doubled. Synthetic materials production has left behind hundreds of contaminated sites, such as the notorious Love Canal hazardous-waste dump in New York state.



ROBERT VISSER/GREENPEACE

Added up, raw materials industries account for a major share of industrial energy use and pollution. Just four primary production industries – paper, plastics, chemicals, and metals – account for 71 per cent of the toxic emissions from all manufacturing in the United States, for example. Similarly, just five primary materials industries – paper, steel, aluminum, plastics, and container glass – account for 31 per cent of US manufacturing energy use. And the search for virgin resources to feed those industries has increasingly collided with the few indigenous peoples who had remained relatively undisturbed by the outside world.

Underlying today's seemingly boundless demand for raw materials in industrial countries is a radical increase in per capita consumption: materials use has grown far faster than population. In the United States, for instance, the Bureau of Mines estimates that total consumption of virgin raw materials was 17 times greater in 1989 than it was in 1900 – a span during which the country's population grew just a little over *three*fold.

Despite the environmental impacts of the materials economy, the principal subject of debate over materials policy in the last several decades has been how soon we are likely to run out of non-renewable resources. Yet the ecosystems that provide us with renewable resources could well collapse long before we reach that point.

Political challenge

It is imperative, then, that the developed countries find ways to cut their materials consumption sharply. Friedrich Schmidt-Bleek, an economist with the Wuppertal Institute, a German environmental research centre, argues that to arrest global environmental degradation, a 50 per cent reduction in worldwide materials consumption is in order – and that to do so, industrial countries need to aim for a 90 per cent reduction in their throughput of materials.

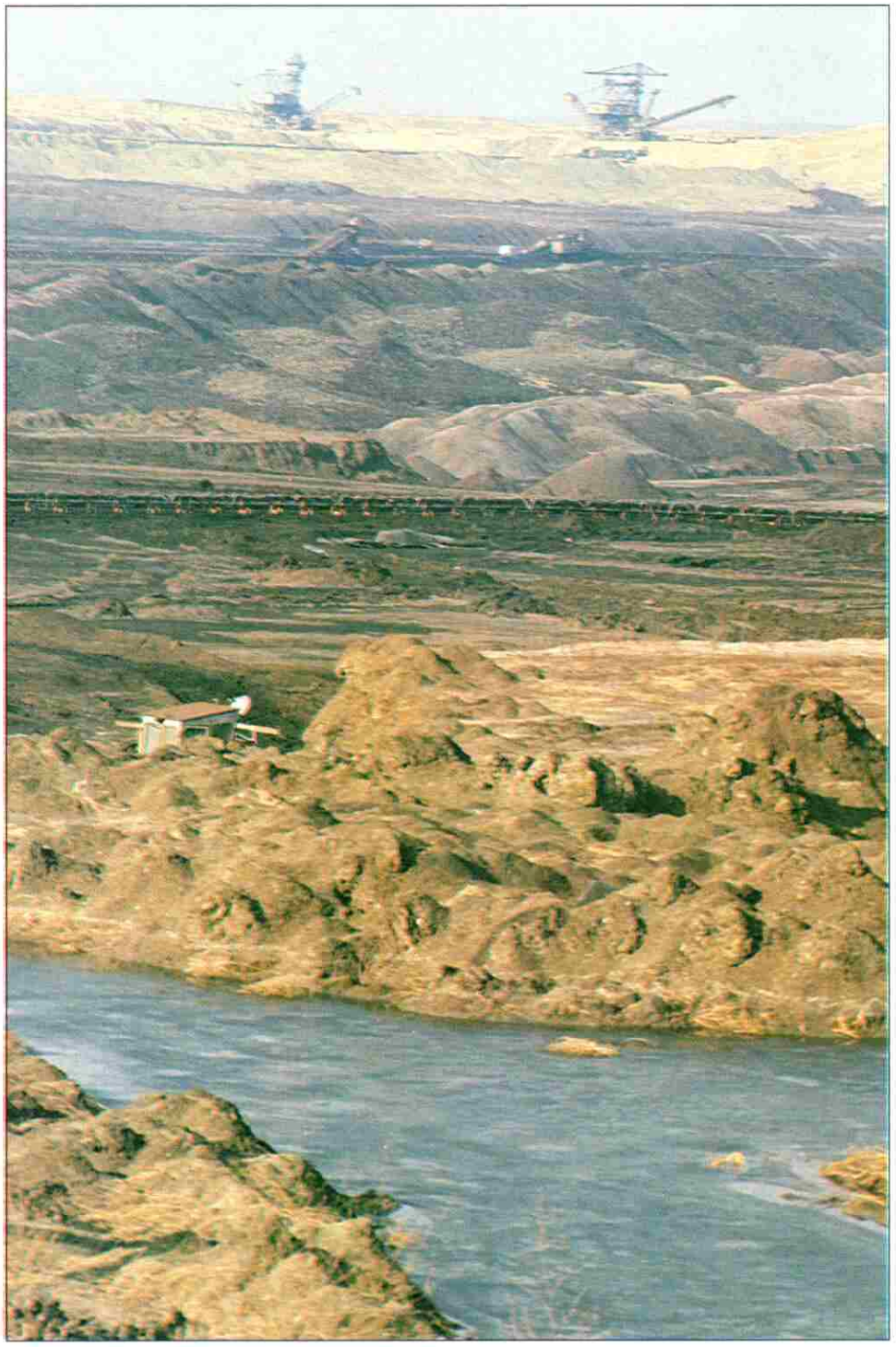
The political reality, of course, is that policy makers are not likely to pursue radical reductions unless they are

convinced that living standards won't suffer. For this reason, reductions might at first glance seem impossible. But to keep that in perspective, it is useful to recall the scepticism that greeted the concept of dramatically improved energy efficiency two decades ago. Since then, new lighting, heating, cooling, insulation and manufacturing technologies have made it possible to cut energy use by three-fourths or more in many applications. The improved technologies are now often cheap enough to make energy conservation a better investment than energy production

Countries where a wide range of energy-efficient technologies are now being put into place – much of Europe, for example – have made such changes possible by making a 180-degree turn in their energy policies, which used to focus exclusively on expanding supply by building new power plants. A similar turnaround is now needed in materials policies.

MARK EDWARDS/STILL PICTURES

Above: *Railway wagons, Mexico City.*
Below: *Open-cast coal mine near River Maritsa, Bulgaria.*



JECKO VASSILEV/STILL PICTURES

To reduce flows of materials, we need a revolution in how we think about them – a transition as profound as the movement from the Stone Age to the Bronze Age, or from bronze to iron. This revolution, however, will centre not on a new material, but on how to use existing materials far more efficiently. A materials efficiency policy would have a simple objective: to provide services – shelter, packaging, transportation, and so on – with far smaller quantities of materials. Its consequences would be manifold and complex, involving a top-to-bottom redesign of the materials economy.

A wide variety of items, from bottles to shipping containers, will have to be reused dozens of times before being broken down for recycling. That will require a vastly expanded infrastructure for reuse, repair, and remanufacturing. Recycled paper mills will outnumber mills equipped only for virgin fibre. Smelters fed by recycled metals will replace a major share of mining operations. Cities, where used resources, factories, and labour are concentrated, will become a more important source of materials than rural mines or forests.

Bringing about change on this scale is going to require more than today's incremental increases in governments' environmental budgets, curbside pick-up of newspapers, and the occasional trip to the community bottle bank. The job demands an infusion of capital, design skill, imagination, and public commitment comparable to the US economic mobilization during World War II. Like that process, this one will have to proceed from public policies, but its principal players will be industrialists, financiers, engineers, designers, and thousands of small businesses.

The effects of this revolution will be pervasive. It will alter investment strategies and make notions of "planned obsolescence" obsolete. We will have to cease to define ourselves primarily as consumers. In our personal decisions about what we eat, how we work, and how we enjoy ourselves, we will have to find ways to move from our throwaway culture of convenience toward an ideal of durability. ■

The materials revolution

by John Young

The first step in the materials revolution must be to turn present misguided economic policies around. Raw material production should be taxed, rather than subsidized, and industries and households should have to pay the full cost of disposing of their waste – with the clear understanding that a more efficient economy will make it well worth their while.

Some countries are already taking their first steps in this direction. Germany, for example, has sought to reduce waste by making manufacturers responsible for the ultimate fate of their products. Germany's packaging ordinance has resulted in the establishment of a separate, industry-run collection and recycling system.

It has also led to the virtual elimination of certain types of redundant packaging, such as boxes containing tubes of toothpaste or cans of shaving lotion. Similar programmes are now being developed for automobiles and electronics. The idea that consumers might lease, rather than own, many goods, so that ownership – and responsibility – for those items would eventually revert to their makers, is also being considered.

Smarter design

Economic incentives for efficient use of materials are crucial, but they are only the first step in a broader revolution. Materials efficiency will be made a reality through environmentally smart design: bringing the product or service to the user with a minimum of resource consumption and environmental damage.

Often this requires more creative thought about what, exactly, the *purpose* of the product is. The ultimate purpose of a road, for example, is to bring people together with the goods and services they need for work or recreation. But better community design – putting people closer to what they need, and planning for walking, bicycling, and public transport – may allow much of this to be done without the road – or with a smaller one.

In similar ways, well designed buildings can shelter more people while requiring less material and energy; refillable bottles can deliver liquid at far less environmental cost than throwaway containers; libraries and computer systems can offer thousands of people access to a "book" or "journal" without requiring a new paper copy for each new reader.

Whether the product is a road or a text, materials-efficient design emphasizes the sharing and reuse of resources. Durability and ease of repair are basic objectives. Designers will have to consider individual items within the context of the entire system in which they will function.

An instructive model for this kind of interdisciplinary approach can be found in the design of energy-efficient buildings. Careful insulation, the use of heat-reflective exterior materials, proper landscaping and the like can allow the use of heating and cooling systems much smaller than conventional designs would require.

Even so, smart design will remain a very difficult art until we have better information on the environmental costs of the materials themselves. Several countries now have "green labelling" programmes – such as Germany's Blue Angel label – which are intended to encourage purchases of environmentally-preferable products. But existing green labels provide little detailed information, and are directed primarily at consumers.

What may be more important is a form of in-depth green labelling for designers and builders. Information on a material's origin, the environmental costs of its production and so forth will have to become an essential part of its design specifications.

Finding the money

The money for all of these changes cannot come from government appropriations alone, although such funding will be important for leveraging private investment. For the most part, the private sector will have to underwrite the recycling plants, the collection and distribution centres and the numerous other facilities that will make up the new materials infrastructure.

One way of doing this is to work through intermediary institutions, such as the Materials for the Future Foundation, in California, which provides grants, loans, business advice and policy advocacy to community-based recycling and reuse enterprises.

Another important way to improve such businesses' economic prospects is to develop secure, stable, and organized markets for secondary materials. Trading of secondary aluminium began on the London Metals Exchange in 1992, and another, broader initiative in the United States shows great promise. The Recycling Advisory Council, a programme of the National Recycling Coalition, has been working with the Chicago Board of Trade, one of the world's premier commodities markets, to develop a formal trading system for recycled materials.

Directly encouraging or requiring commercial use of secondary materials can also help. For instance, 11 US states have set minimum recycled-content standards for newsprint, spurring sharp growth in recycling. There were only nine newsprint recycling plants in North America in 1988; now there are 29.

Mining the cities

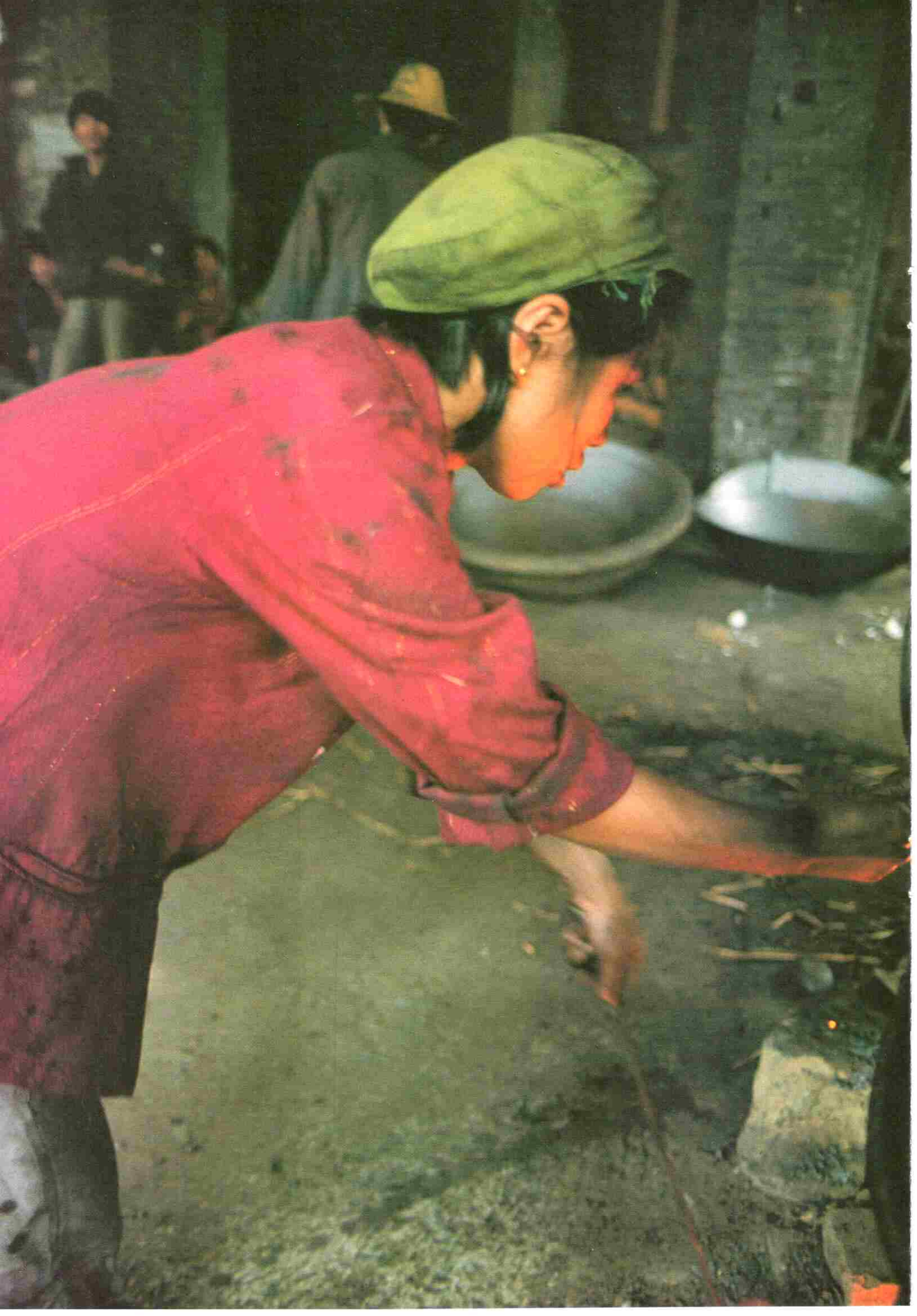
The current materials economy presents a classic political problem: those who benefit from the status quo (mining and timber companies, waste disposal firms, bulk commodity producers) are well-organized and politically powerful. The rest of society, which is paying the price for inefficient use of materials, is dispersed and for the most part does not perceive that there is a common solution – an efficiency strategy – to the wide range of problems that are created by materials use.

But the ecological and economic benefits of reduced virgin materials production and waste disposal are great enough to build a powerful coalition for reform. The biggest payoff may eventually be an increase in one of society's most precious assets: jobs.

Industries founded on secondary materials will allow pioneering companies to open up entirely new economic sectors. Even when such industries are portrayed simply as branches of waste management, their job intensity is striking. Every million tons of solid waste tends to generate 1,600 recycling jobs.

The way beyond our virgin materials addiction lies in attacking the disease itself, and not just managing its symptoms, waste and pollution. If we can learn to curb our materials appetite and mine our cities for what we still need, we may have a chance to heal the countryside and build stronger communities in the bargain. The first step is for everyone to recognize the common roots of our problems; the next is to organize well enough to generate the political will for change. ■

John Young is a senior researcher at Worldwatch Institute in Washington and is co-author of the recently released Worldwatch Paper, The Next Efficiency Revolution: Creating a Sustainable Materials Economy.



China's consumption frenzy cannot last

ALAIN LE GARSMEUR/PANOS PICTURES

by Vaclav Smil

Never before in human history has a large population improved its standard of living so fast as the hundreds of millions Chinese have done since the beginning of economic reforms in 1979.

During that year food consumption was barely above the subsistence level, and material possessions were scarce and simple. Total food energy intake was just above the minimum existential need, and more than four-fifths of it came from monotonous diets of cereal and leguminous grains. Annual per capita intakes averaged less than 6 kg of meat (in practice this meant eating little bit of fatty pork once or twice a week), less than 1 kg of eggs (or one egg per month), and less than 2 kg of cooking oil (an equivalent of a couple of tablespoons a day in a country where stir-frying is used to prepare four out of every five meals).

A bicycle (only its brand name would be elegant, and only every third family owned it), a watch (naturally not a digital one, but a clumsy copy of an earlier Soviet model) and a foot-operated sewing machine (not unlike early Singer models) were the three precious wedding gifts in China's countryside, where people bought a new pair of proper (leather) shoes only once every three or four years.

LUKE WHITE/PANOS PICTURES

Left: *Steel worker in Fengjie, China.*
Top: *Baotou steelworks, Inner Mongolia, China.*
Above: *Delivering coal, Wanxian, China.*

Rapid privatization of farming transformed the country's agriculture within a few years. By the late 1980s average per capita supply of food energy rose to within less than 10 per cent of the Japanese mean, and its variety had increased enormously. Consumption of cooking oil, eggs and fish more than tripled, that of meat more than doubled, and market stands now overflow with a wide choice of fruits, vegetables, mushrooms and speciality products ranging from candied fruits to deep-fried snacks.

Now there are more bicycles than households in rural areas, almost four out of every five Chinese families have a TV set, three in five have an electric fan, one in five has a VCR, and one in eight a refrigerator.

Peasants used the proceeds from privatized farming to build new, and often surprisingly large, houses, and while the living space remains at premium in large cities, food consumption and, private cars aside, material possessions of most of their inhabitants are now rapidly approaching the South Korean or Taiwanese level.

But this remarkable achievement is also the reason for a deep concern because what Shanghai, Guangzhou (Canton) and other, less populous, newly-rich coastal cities can do cannot be readily extended to 1.2 billion people (China passed that mark in April 1994). Contrary to the recent gushings of instant China experts about the growth prospects for the ultimate East Asian dragon economy, China cannot simply replicate what Japan or the smaller dragons have done.

Just a couple of quantitative comparisons with South Korea illustrates this fundamental point. China consuming as much grain per capita as South Korea and importing an equivalent share would have to buy annually about 250 million tonnes. In contrast, total global grain trade has recently amounted to no more than 150 million tonnes a year.

China consuming as much primary commercial energy per capita as South Korea and importing an equivalent share would have to buy annually about two billion tonnes of crude oil. In contrast, total global crude oil trade has recently amounted to no more than 1.4 billion tonnes a year.

Although China may never be another dragon in average per capita consumption, it is already one in absolute terms: no country burns more coal, uses more nitrogenous fertilizer or manufactures more household refrigerators than China. Recent double-digit growth rates of GDP will have to come down soon, but rates between 6-7 per cent would still mean doubling of China's economy every 10-12 years, and the country would become the world's leading producer of many industrial and consumer items – ranging from steel to mopeds – with-

LUKE WHITE/PANOS PICTURES

Contaminated waters at Three Gorges Dam spread hepatitis to 10,000 people.

LUKE WHITE/PANOS PICTURES

in a generation.

This will only worsen China's serious environmental problems. The country is already the world's largest producer of particulate matter, sulphur dioxide and untreated waste water, and the second largest emitter of greenhouse gases. A generation from now it will, most likely, retain the three unenviable primacies – and it will also become the world's largest producer of greenhouse gases (carbon dioxide from fossil fuels, nitrous oxide from fertilizers and methane from coal seams and paddy fields).

China's incipient mass consumption is already causing enormous amount of environmental pollution and ecosystemic degradation. My preliminary work shows that the annual cost of this burden is equal to at least 15 per cent of the country's GDP. Concentrations of particulate matter and sulphur dioxide, especially during winter in northern cities, are now commonly more than ten times higher than in Western or Japanese urban areas. More than four-fifths of China's waste water is not treated and its total 1990 flow is forecast to double by the year 2000.

A nationwide survey found that more than 80 per cent of major rivers are polluted to some degree, over 20 per cent to such an extent that it is impossible to use their water for irrigation, and more than five per cent had no living fish. Some four-fifths of China's surface water in urban areas is contaminated, and only six of China's 27 largest cities had drinking water quality within the state standards.

A great deal of environmental degradation results as the emerging Chinese consumer society is trying to emulate some Western arrangements – sprawling suburbanization, multilane highways, promotion of mass tourism – which even rich Western countries are now finding burdensome. Substantial losses of fertile peri-urban farmland taken over by the huge wave of new industrial and residential construction will have serious cumulative effects on China's long-term food production capacity.

Once again, China has travelled from extreme to extreme in less than a generation. During nearly three decades of Maoism it had to endure economy mismanaged by doctrinaire bureaucrats which could deliver only shared poverty. Dengian modernization boosted the standard of living, but its increasingly frenzied pace has created unrealistic expectations, pervasive corruption, increasing income disparities – and severe environmental impacts.

The future of China as a stable modern society will depend to a large extent on finding the balance between understandable developmental aspirations and limits imposed on such dreams by the country's enormous population, limited natural resources, and stressed environment. ■

Vaclav Smil is an ecologist interested in interaction of environment, energy, economy, food, population and public policy. His latest books are China's Environmental Crisis *(M.E. Sharpe 1993) and* Global Ecology *(Routledge 1993).* Energy in World History *appeared in October 1994.*

The timing, efficiency and effectiveness of the future participation of companies in dealing with the waste they help to create will depend on a wide range of political, regulatory, economic and social factors, many of which have yet to be seriously addressed. More specifically, they will depend on the answers that are found to a number of key questions.

What mix of regulations, incentives and eco-taxes will be needed to get business actively and creatively involved? What sorts of markets will evolve as a result – and who will be best placed to serve them? And how quickly will participating companies turn a consistent profit?

We now know the scale of the problem: Europe, for example, produces more than 2.5 billion tonnes of solid waste a year. But there are very different views on the likely – and appropriate – roles of business in defining and implementing sustainable waste management strategies.

Open one ear and you hear people say: *Why should we now trust those who have proved so untrustworthy in the past?* Open the other ear and you hear: *Who better to get us out of this mess than those who helped get us into it?* But this confusion may itself be a reflection of a profound paradigm shift now under way in the environmental arena.

As we start to switch from 'Words to Action', to quote the mission of the 1992 Earth Summit, so we see signs of an emerging consensus that the transition to more environmentally sustainable forms of development is, quite literally, impossible without the active, committed involvement of business. Companies of all sizes will increasingly be seen as partners in the process of environmental restoration and sustainable development.

So what are the implications for waste management? The whole area of waste reduction, re-use, recycling and other forms of waste management is clearly central to the environmental task facing industry. But it is worth noting that improved waste management, and even the new approach of 'eco-efficiency' advanced by such organizations as the Business Council for Sustainable Development, is only part of the solution to the problems we face. In fact, companies responding to the broader environmental agenda have typically moved through three main levels.

Level 1 involved waking up to the

Can big business help?

Big businesses – and smaller enterprises too – can, must and will play a key role in developing solutions to the world of waste, says *John Elkington*.

fact that there was a real environmental agenda to be addressed – and that industry was to be held accountable for many of the things going wrong. This represented the threshold of a new paradigm for many business people. They were forced to recognize that the environmental agenda had legitimate claims on their time, money and other resources. In this phase, companies drafted environmental policy statements, appointed environmental managers and, usually later, environment directors. Not surprisingly, perhaps, most have seen this stage of environmental management as a net cost on the business.

Level 2 has involved using energy and raw materials much more efficiently. The 1970s (in the wake of the OPEC oil crises) and 1980s, saw the emergence of innovative corporate energy efficiency and waste reduction programmes. Two examples that come to mind are 3M's 3P (Pollution Prevention Pays) Programme and Dow Chemicals' Waste Reduction Always Pays (WRAP) Programme. 3M has provided endless striking examples of how money can be saved by applying the basic formula: 'Pollutants (waste materials) + knowledge (technology) = potential resources'. The company has focused on the elimination of waste through product reformulation, process modification, the redesign of equipment and the recovery of waste materials for re-use.

3M has saved or made hundreds of millions of dollars with this approach. Given its success, it has been astonishing to see how slowly the 3P approach has been disseminated through the rest of the business community – but such programmes are now becoming more common, with other companies beginning to talk of 'doing more with less' or of the 'dematerialization' of their products.

Sony, for example, has been aiming to achieve a 1995 goal of a reduction in its industrial waste output to 70 per cent of 1991 levels. Under the new scheme, Sony factories in Japan will collect all plastic packaging which was previously incinerated or landfilled, separating the different materials. These will then be returned to disposal firms at no cost, saving Sony the money it would previously have paid to the disposal firms. They, in turn, will sort the waste materials more thoroughly, checking them against quality standards and selling them to participating Sony suppliers at a cost lower than that for new packaging. They will then use the recycled packaging when selling their parts to Sony, which has agreed to buy the components packaged in recycled material for the usual price.

Clearly, however, business cannot – and will not – embark on such programmes without strong encouragement from government. Indeed, a number of recent government initiatives have helped build the pressure in Levels 1 and 2. So, for example, Germany's Packaging Ordinance and Dual System (best known for its 'Green Dot'), aim to force retailers and packaging manufacturers to assume responsibility for waste materials and have helped to wake growing numbers of companies up to the emerging challenge.

Level 3, which has been even slower to get under way and seems likely to be at least as challenging as the previous two stages, will involve not just corporate awareness and efficiency improvements but also the substantial re-invention of many markets – and, inevitably, of the companies and industries that serve them. This will require not just new technologies and new products, but also new concepts of the business a particular company is in. It is quite conceivable, for example, that a major chemical company that had spent years fighting the environmental agenda might eventually redefine itself as an environmental services supplier.

A recent report by consultants Ecotech for the UK Government concluded that companies – whatever their size – will find growing opportunities such as:

ARGUS/STILL PICTURES

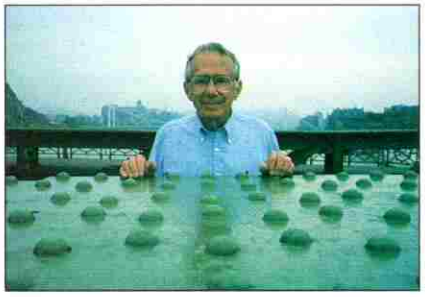
MARK EDWARDS/STILL PICTURES

Above: *Dismantling Volkswagen cars for recycling in Germany.*
Left: *Seedlings for reforesting an ALCOA bauxite mine in Australia.*

Selling energy conservation

Before the 1973 'oil crisis' the United States, like many other countries, had cheap electricity. Electricity demand was doubling every decade. "But the OPEC crisis changed prices and perceptions, triggering an explosion in energy efficiency measures," says Dr Arthur Rosenfeld, Professor of Physics at the University of California at Berkeley and Director of the Centre for Building Science at the US Department of Energy's Lawrence Berkeley Laboratory.

"By 1985, when OPEC collapsed, the US had avoided the need to construct 350 Gigawatts (GW) of new electric capacity, equivalent to 350 of the ill-fated Three Mile Island nuclear reactors." The most successful efficiency improvements were made in household appliances and equipment – especially



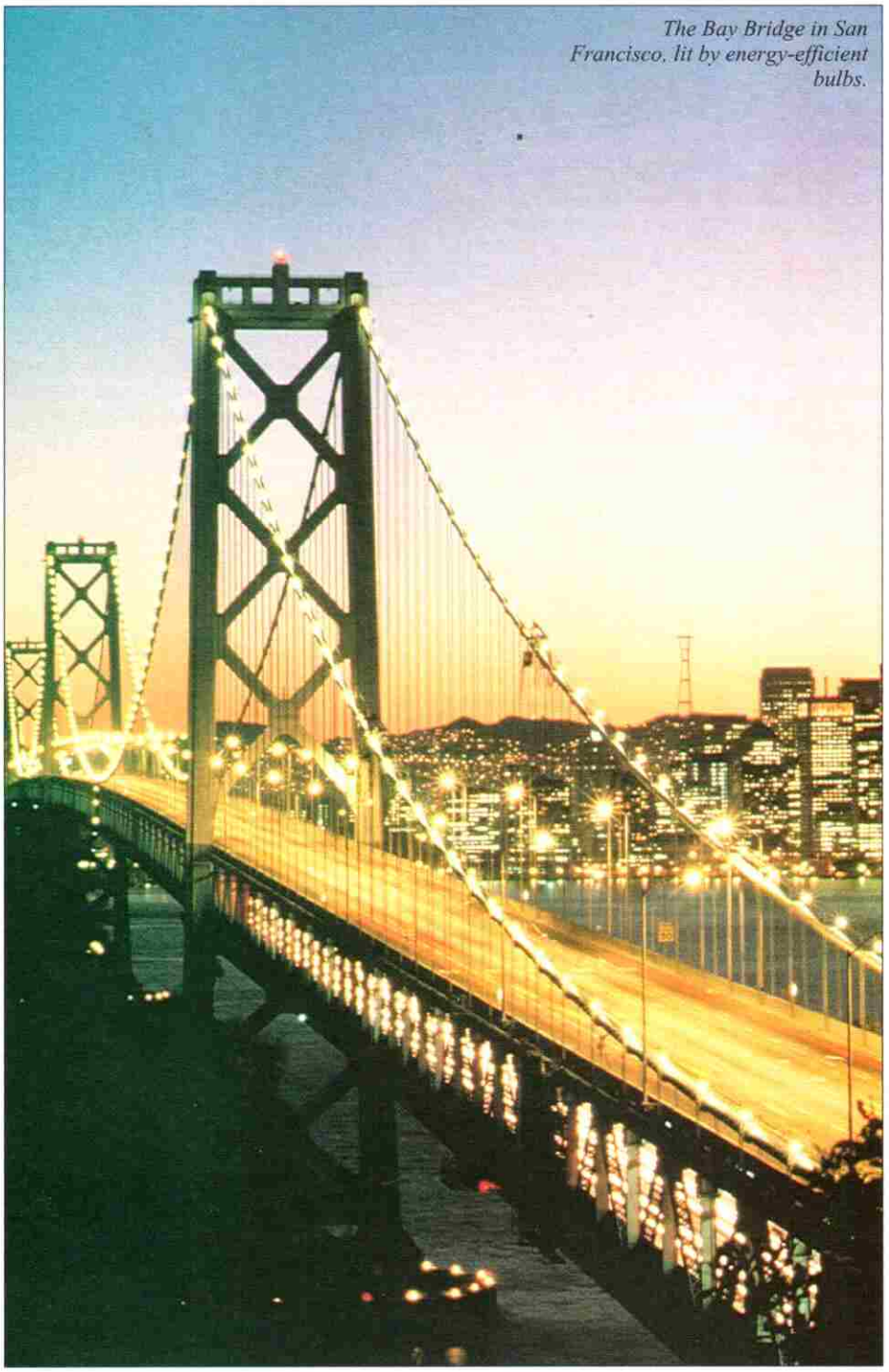
refrigerators, freezers, televisions, heating units and air conditioners – lighting, and by tightening up energy efficiency standards in new buildings.

"But the real innovation we achieved was to change the profit rules for utilities," explains Rosenfeld. "In essence, we convinced them that we could make them rich, not by selling more electricity, but by selling electrical services." Utilities discovered that it was more profitable to save money for their customers, and share in the savings, than to sell raw electricity or gas.

"In several states, mainly on the West Coast, Wisconsin and in New England, utility stockholders can now keep 10–15 per cent of the societal savings," notes Rosenfeld. "This has spawned a $3 billion a year conservation industry, funded by utilities and offering society a payback time on its investment of about one year."

Ironically, the revolution in the way some US utilities view energy has not caught on elsewhere. Even though there is plenty of scope for improving energy efficiency in homes, offices and industries in Europe, especially in the battered economies of Central and Eastern Europe and in the former Soviet Union, change has been slow.

Partly to blame are the big development banks. Take for example, the European Bank for Reconstruction and Development in London. In a March 1992 report, the Bank pointed out that short-term conservation and efficiency measures could save at least 15 per cent of total energy demand in Central and Eastern Europe by the end of 1995, "without the need for major investment." So far, few of these



The Bay Bridge in San Francisco, lit by energy-efficient bulbs.

TAMAS REVESZ

BAIRD/GREENPEACE

recommendations have been implemented.

The benefits of energy conservation are legion. Recent history has shown what can happen. In the decade following the first oil shock, per capita energy consumption fell by 5 per cent in the member states of the OECD, while their per capita gross domestic product grew by a third.

Buildings in the OECD countries use a quarter less energy now than they did in 1973, while the energy efficiency of industry has improved by a third. Worldwide, cars now get 25 per cent more kilometres per litre than say they did in 1973. In all, increased efficiency since 1973 has saved the industrialized countries of Western Europe, North America and Asia, some $250 billion.

Professor Rosenfeld is convinced more savings could be achieved with relatively little investment in both developed and developing countries alike. More efficient lighting, using a new generation of compact fluorescent lamps (CFLs), offers incredible savings, especially for lowering electricity demand and therefore eliminating the need to build more costly power plants.

"Each compact fluorescent lamp saves about 50 watts of peak power," claims Rosenfeld. "Take Central and Eastern Europe. If every house were outfitted with CFLs, they would save consumers about $5 billion a year in electric bills."

"The scope for further energy savings is enormous," maintains Rosenfeld. "But politicians need to recognize it and seize the opportunity." ■

Don Hinrichsen

- air pollution control (eg catalytic converters, gas treatment plants, turnkey contracts);
- noise and vibration control (eg noise and vibration measurement, acoustic barriers and enclosures, quiet technologies);
- water and wastewater treatment (eg membranes, aerobic and anaerobic treatment systems, trenchless boring);
- marine pollution control (eg booms, adsorbents, control systems, emergency response services);
- waste management (eg landfill liners, landfill gas equipment, composters, recycling technology, waste reduction services);
- contaminated land remediation (eg adsorbents, injection systems, treatment processes);
- energy management (eg energy audits, energy management control systems, efficient technologies, insulation, maintenance services);
- environmental monitoring (eg continuous emissions monitoring systems, equipment installation and maintenance);
- environmental services (eg technical consultancy, risk analysis, laboratory testing and analysis).

But, while such market opportunities will clearly be of growing importance, and attract the interest of a wide range of industries and companies, many big companies have so far felt more comfortable in sponsoring public recycling initiatives than in radically restructuring the waste-generating aspects of their own operations.

British Telecom (BT), for example, has sponsored a series of initiatives designed to boost recycling in cities. Further afield, to prevent the coral reefs and beaches of the Maldives in the Indian Ocean being littered with empty drinks bottles and cans, the Düsseldorf charter airline LTU provides sunseekers with 30 small garbage bags on arrival. They are asked to collect all their inorganic waste and put it in special containers when checking in for the flight home. LTU expects to fly 200 tonnes of refuse back to Germany each year.

Although such initiatives are important in terms of building public awareness and commitment, they need to be complemented by a much more business-oriented approach. US-based international waste management companies like Browning-Ferris Inc (BFI) and Waste Management (WMX) are already competing for market share across Europe and Scandinavia alongside local firms. But if business generally moves to the third level of response, and encourages the general public to do likewise, the chances are that the ultimate waste disposal markets will be much smaller than would currently be forecast.

In terms of sustainable development and resource efficiency, this is a highly desirable outcome. For companies like BFI and WMX, there is no immediate cause for concern: the need for new, integrated waste management infrastructure projects is very considerable, both in Europe and in other world regions. But these trends do suggest that many such companies will eventually have to decide whether they are waste management or resource efficiency companies. The key challenge in this area will be to find new ways of 'adding value' to reclaimed materials and, in parallel, to develop new product designs which facilitate the process of waste reduction, re-use and recycling. ■

John Elkington is a Director of Sustainability Ltd, a UN Global 500 Laureate, a member of the EU Consultative Forum on the Environment and author or co-author of 30 published books and reports, including the best-selling Green Consumer Guide.

Giving computers a new life

JIM HOLMES/PANOS PICTURES

Assorted calculator parts for sale in a Bangkok street stall.

By the year 2005 over 150 million computers will be dumped in landfill sites worldwide, according to estimates by the Carnegie-Mellon University in the United States. The rate of technological development has been so rapid in recent years that equipment is often discarded while still in full working order, simply because it is unable to support the latest generation of software.

This built-in obsolescence leads to an average replacement period in Western countries of only three years, following which equipment is usually buried or incinerated, squandering resources and dispersing a variety of substances, including the toxic metals mercury and cadmium, into the environment.

Concern is such that the European Commission has targeted electronic waste as a 'Priority Waste Stream', establishing a working group which will collate information on the current scale of the problem. Recommendations on reclamation strategies and manufacturing processes will be followed by European wide legislation.

From a purely financial point of view the waste of resources is staggering, with one study, completed by the UK-based Centre for Exploitation of Science & Technology, estimating that in that country alone around 6 million items of electronic equipment with a reclaimed value of £50 million ($75 million) is buried each year. Material resources lost include high quality plastics, tin, copper and aluminium in addition to precious metals such as nickel, palladium, silver and even gold.

The situation is all the more wasteful when viewed in the context of developing countries attempting to get on to the first rung of technological development. While the latest technology may be affordable to governments, the costs can prove prohibitive to indigenous businesses and industry who may lack both the finance and the training support.

One company which is linking the disposal problems of the affluent West with the requirement for entry level technology in developing countries is R Frazier Ltd based at Dumfries in Scotland. Run by a former IBM director, Liam McKenna, the company specializes in reclaiming and re-selling redundant computer and electronic equipment. By sharing the profits with the original suppliers, the company allows businesses to turn a disposal cost into an asset.

Mr McKenna explains: "We collect redundant equipment from a variety of sources then repair and rebuild complete systems, taking a processing chip from one, a monitor from another and so on, creating a working system from several unsaleable ones." Even when systems cannot be rebuilt components are removed and exported, where they are stimulating the development of home-based computer assembly lines. When equipment does not contain working components they are still not discarded: metal and plastics are reclaimed, resulting in less than 5 per cent of the equipment received being consigned to landfill. ■

Graeme McDonald

Salvation from sewage in Calcutta Marshes

Over the past century, Calcutta has developed a system of sewage disposal that is among the most efficient and ecologically benign in existence. *Charlie Pye-Smith* **reports.**

Calcutta is one of India's most beautiful cities; it is also the most squalid. Kipling's 'City of Dreadful Night' was built for one million people; it now houses ten times that many. The municipal authorities are crippled by apathy and overmanning and the public services are a disgrace.

Yet in one field the city is a world leader: every day 20,000 people living and working in the East Calcutta Marshes transform a third of the city's sewage and virtually all of its domestic refuse into 20 tonnes of fish and 150 tonnes of vegetables.

"It is a system of genius," explains Dr Dhrubajyoti Ghosh, executive engineer for the Calcutta Metropolitan Water and Sanitation Authority, "and it's perfectly suited to countries in the developing world. The two basic requirements seem to be poverty and sunshine, and we have plenty of both."

The journey towards the marshes takes you through some of the grimier parts of Calcutta, past the rancid slums of refugees, the tanneries of Chinatown and up to the city refuse dumps of the Dhapa Square Mile. Here gangs of men, women and children comb through mountains of rubbish, picking out metal, plastic, wood, indeed anything with a recyclable value. What is left is a rotting mass of organic matter, the ideal substrate for growing vegetables.

Soon after you leave the dumps you enter an area of startling beauty. The East Calcutta Marshes are a sort of tropical version of the Camargue or the Norfolk Broads: an intimate patchwork of tree-fringed canals, vegetable plots, rice paddies and fish ponds covering some 20,000 acres in all. At the heart of the marshes is the Bantalla sewage works. Built by the British in 1943, these closed down two years later. The fishermen and vegetable farmers of the marshes – the natural ecologists, as Dr Ghosh calls them – had already developed a cheaper and more productive way of dealing with sewage.

Approximately a third of the city's sewage enters the marshes. While some goes straight to the *bheris*, the sewage-fed fish ponds which cover around 7,500 acres, some is channelled towards the garbage farms. These are

mainly clustered around the area of inflow and the Dhapa Square Mile and they are hugely productive: the vegetables here are grown on a rich layer of organic matter taken from the refuse dumps and irrigated with sewage water.

In the *bheris* algae feed on the raw sewage, whose nutritional value is transformed into edible protein with a dozen commercial species of fish gorging themselves on the thick algal soup. The effluent from the *bheris* is also used, mostly in the rice paddies which are dotted around outer reaches of the marshes.

This is a system of great complexity and the fact that we now understand how it works is largely thanks to Dr Ghosh, who first visited the marshes in 1980. "The law and order situation was terrible then," he recalls. "Gangsters frequently looted fish and the local political leaders were sometimes keen to keep the dishonest happenings quiet. In the early days I was frequently threatened and told, 'We'll kill you if you come back'."

Dr Ghosh kept coming back and by 1985 he had mapped the entire area. Since then he has persistently argued that Calcutta's self-help sanitation system is replicable elsewhere in India and the tropics. His work has made him

many enemies. Engineers, he points out, have little enthusiasm for such self-help schemes: "Conventional sewage systems are invariably funded by multinationals or other highly financed groups – and they are prepared to pay engineers large sums of money to design and build them." However, it has been the property speculators who have proved to be Dr Ghosh's most unsavoury adversaries. Over the years various developments have chipped away at the marshes. In the 1960s a large chunk was lost to a housing scheme; in the 1980s a new road brought the marshes closer to the city and many fish ponds were drained to make way for housing for the rich.

Dr Ghosh opposed many of these schemes and for many years he was constantly threatened. Recently the state government saw sense and recognized the area officially as a waste recycling region. There is now a general presumption against further development, though whether that holds good remains to be seen.

During the past few years Dr Ghosh's department has helped to install a number of low-cost, self-help sanitation schemes outside Calcutta. At one site I visited 21 hectares of land had been set aside to treat 1 million litres of sewage a day. Dr Ghosh hoped that the ponds, which were in the process of being dug, would yield 50 tonnes of fish a year. "This isn't a money spending exercise," he said. "It's money saving, and we could do something similar almost anywhere else in the tropics."

A keen supporter of these natural systems of sewage disposal is the West Bengal Fisheries Department. The department has appointed a technical adviser who had done much to help a number of fishermen's co-operatives. The best known of these is the Mudialy

ALL PHOTOS: CHARLIE PYE-SMITH/STILL PICTURES

Left above: *East Calcutta marshes.*

Middle: *Clearing water hyacinths in the marshes.*

Below: *Fishermen from the co-operative society bring in the morning catch.*

Above: *Auctioning fish at the Mudialy Co-operative.*

Fishermen's Co-operative Society, whose 430 members harvest over one tonne of fish a day from ponds at the heart of Calcutta's dockland.

Since 1980, the Mudialy fish catch has risen by a factor of seven, reflecting both the hard work of the co-operative members and the expertise of the Fisheries Department ecologist who has helped to refine the system. The 23 million litres of polluted water which enters the ponds each day contain not only sewage, but industrial waste as well; by the time the water leaves it is almost drinkable and it supports 40 species of fish. Water hyacinth is used to leech out heavy metals, while other plants absorb the grease and oil. "Nature has given us the means to purify water and that's what we do here," explained the chairman of the co-operative. A study carried out by the National Environment Engineering Research Institute attests to the efficiency of the system: 99.9 per cent of faecal coliform coming into the system was removed during the passage through the ponds. Mercury levels in the incoming water were high, but none could be detected in the outflow.

Several dozen of the Mudialy fishermen are reformed criminals: fishing, they have discovered, pays better than crime. "When I joined the co-op in 1961," the co-operative accountant (never a member of the criminal classes) told me, "our living conditions were dreadful. I lived in a one-room mud hut and couldn't afford to eat much. Since 1986, our standard of living has risen dramatically."

Now the accountant has a three-room house with a pleasant garden and view over a large pond. His children eat three decent meals a day, with fish every lunch. The educational costs, as well as medical care for the whole family, are paid by the co-operative's earnings from fish. In 1980, barely a fifth of the fishermen's children attended school. Now they all do.

Kipling described Calcutta as the city "where the cholera, the cyclone, and the crow come and go, by the sewerage rendered foetid, by the sewer made impure." Since Kipling's day, sewage has taken on a new meaning for Calcutta: it has become a resource rather than a nuisance, thanks to the 20,000 natural ecologists who have created the marshes. ■

Charlie Pye-Smith is a writer on environmental issues and co-author of The Wealth of Communities *(Earthscan, London, 1994).*

How Cairo *zabbaleen* turn rags into riches

Half of Cairo's garbage is recycled by an army of collectors who have found ways to improve their lives and plan their families. *Bishakha Datta* **reports.** *Jeremy Hamand* **took the pictures.**

Eid Anwar's Cairo home would make a rainbow blush. The roof is a clamour of plastic debris bursting with every mad hue and colour. Inside, a whirring machine rhythmically chews uneven plastic pieces and spits out shapeless blobs, while a rusty metal arm showers out handfuls of recycled plastic granules.

Recycling plastic is a relatively recent occupation for Eid Anwar Abu El Saad, who was earlier a trader. After buying used plastic from garbage collectors, "I would just wash it and cut it into small pieces," he says. "Then I would sell it to someone who would recycle it." Today, with a plastic crusher bought on credit, Eid Anwar is a proud cottage industrialist with three employees, a bigger house – and growing stature among his neighbours.

Behind Eid Anwar's visible success lies the unseen hand of the Association of Garbage Collectors for Community Development. The non-profit Association, which has 7,000 members, provides health care, learning facilities, animal clinics, and credit to the *zabbaleen* – landless migrants from southern Egypt who collect half the 6,000 tons of garbage that Cairo generates each day. "The Association gave me a loan to buy this," says Eid Anwar, who owns one of the three plastic crushers in the Mokattam, a sandy quarried hill that is home to many *zabbaleen*.

Like Anwar, others in the Mokattam have now turned to recycling – some even risking their own money for uncertain gains. A walk through Rashid Bassit's kitchen reveals a factory in the room behind. "I bought it with my own money," says Bassit, who manufactures hangers from recycled plastic pellets. Round the corner from his house, a metallic crusher draws attention to another home-based recycler, who is turning waste cotton into wadding for mattresses.

But if the transforming waste transformed the fortunes of men like Anwar and Bassit, it did not, at first, do much for *zabbaleen* women whose culture chained them to the indoor task of sorting rubbish. The chains loosened for the first time in the late 1980s, when another voluntary agency stepped in and taught the women how to recycle waste cotton into wildly colourful rugs.

"A new kind of recycling experiment was needed for the women of the Mokattam," says Laila Iskander Kamel who designed the project for the Association for the Protection of the Environment. The rags-to-rugs project began in 1988 with six looms and 10 teenage girls. "It started by building on an existing community skill – sorting garbage – to address a very urgent need of the people – earning money."

Today, transforming rags has changed the lives of 170 *zabbaleen* girls who earn £E70 to 80 (US$20–24) each month. The girls collect rags each Monday from the Association – which gets cotton scraps form ready-made factories. While the long strips are woven into rugs, the square pieces become patchwork quilts. "We don't waste even one tiny bit," says Samira Abou Seif of the Association.

Seif explains that the project – which trains about 100 girls each year – typically selects the poorest of the poor: those who have never been to school, those in large families, those who still sort garbage, those whose families do not own recycling machines. "Earlier, we used to beg families to give us their daughters," she says. "They would refuse. Today we have a waiting list."

Samia Wadie Hanna is one of the project's oldest employees – and one of

Left: *Eid Anwar's roof of many colours.*
Below: *Rashid Bassit's back room, with stockpiled hangers.*
Bottom: *Rags are transformed into mattress stuffing.*
Overleaf top: *A rubbish picker and her daughter: working for a better life.*
Bottom: *Pigs thrive in a courtyard. Behind the rooftops, Mokattam mountain.*

its biggest successes. Hanna, who used to ride on the donkey cart with her father to pick up trash each day, is now one of five project officers at the Association. Like every other girl at the project, Hanna started out as a trainee on a monthly stipend of £E40 ($12). Today, she supervises storerooms, records sales and inventory, conducts quality control checks – and supports a widowed mother on her monthly salary of £E300–350 ($88–100).

But hauling oneself up from one rung to the next is not as easy as it sounds. Graduation is the first hurdle: to graduate, a trainee must not only complete a 3-6 month course, but must progress from churning out wildly mismatched 'salad' rugs – that are reputedly popular with Texan customers – to crafting delicate, personalized rugs.

The decision to take home a loom is the next big step. Even if a Mokattam girl can commit to repay the £E250 loaned to buy the loom, can she commit to keep the loom spotlessly clean in a tiny house bursting with everything from toddlers to pigs? Doors can't be kept closed since each room has multiple uses; a goat might sneak in and eat the cotton rags. How will she then earn?

"To make a clean rug required a deliberate, conscious effort at keeping the immediate environment surrounding the loom clean," says Kamel. "Thus the loom, the mighty loom, succeeded in taking with it all of the principles of personal and environmental hygiene."

If the Mokkatam girls have learnt to keep their environment clean, it is because the reward – income – meets a real need. Many of the girls have learnt to read and write for similar reasons. "The crucial difference between this and other literacy programme," points out Kamel, "is that literacy addresses a real need – generating income."

From pigs to garbage

Today, the *zabbaleen* – or garbage collectors – may seem as much part of Egypt as the pyramids at Giza. But these landless farmers started picking up rubbish quite recently. Propelled by poverty to Cairo 50 years ago, the *zabbaleen* – who are mainly Coptic Christians – started out breeding pigs. They survived for two reasons: one, there was no competition from Muslims who would not breed pigs, two, pigs could be raised on a cheap diet of trash.

For many years, the *zabbaleen* actually *bought* garbage from the *waahis*, earlier migrants from the oases who had a monopoly on Cairo's garbage routes. In time, they started leasing these routes from the *waahis*. Ultimately, with the realization that sorted garbage could be sold for a profit, a thriving community of pig-breeders turned garbage collectors.

Today, the *zabbaleen* can be found in seven settlements dotting Cairo. Men and children typically do the collecting. Women and teenage girls sort mountains of garbage into neat piles of plastic, metal, glass and paper. Everything is used up: rotting food is fed to the pigs, unusable waste is burnt or turned into compost. But even though they keep Cairo clean – picking up more than half the city's garbage – the *zabbaleen* are still unfairly associated with prostitutes, rogues, beggars and pickpockets. ■

For instance, a girl must be able to read and write Arabic names if she wants to weave personalized rugs that fetch her more money. And a girl who wants to staff a sale at a posh hotel must know how to read the price list. "Otherwise she won't be chosen," says Seif.

This bottom-up need-based approach is the key to the Association's success. A few years back, married women started approaching the Association: like their daughters, they wanted to weave and earn. When household chores made it impossible for them to meet weekly deadlines, the Association did not give up. Instead, it showed the women how to recycle square cotton pieces – too beautiful to be sold for mattress stuffing – into patchwork quilts.

This simple act of recycling patchwork has spiralled into larger benefits for women. Each women is given a sewing machine and an iron when she produces a perfect bedspread. "She can iron her children's clothes, keep her child clean," says Seif. "Then she begins to think of family planning."

Laila Kamal's June 1994 study shows that 64 per cent of the patchwork-quilting women use family planning methods – a significant gain in the Mokattam, where according to one doctor, less than 40 per cent of women deliver in hospital or use family planning. "Family planning does not come as an imposed thing from outside," says Seif. "It springs from the woman's own life, when she realizes that her life can be better."

Seif goes on to explain how the project subtly promotes practices like late marriage that empower women – and ultimately reduce the family size. "If girls are married before 18, they are not entitled to anything from us," she says. According to her, such changes are visible: while girls in the previous generation married as young as 12 or 13, the recycling girls wait until they are 22 or 23. "It's a result of this whole process. It's not imposed."

Perhaps the biggest proof that the process works is Samia Wadie Hanna who was overwhelmed when, last year, she launched a restaurant on the same street where she collected garbage as a child. "I have not just been educated," says Hanna, smoothing her skirt. "I have reached a stage where I can take a decision – and the decision is correct." ■

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Lille: city of the future

The French city of Lille is leading the way in Europe, both in the treatment of its waste and in its urban transport system. *John Rowley* **reports.**

The crossing from England to France by car through the Channel Tunnel is almost boringly undramatic. The drive off the motorway and into the long silver TGV train is a simple business, hardly held up by passport procedures. The 35-minute ride under the Channel is smooth and almost silent. The view from the small windows is blank darkness, the train announcements no different than those in a short lift ride.

But the consequences of this piece of overdue technology are going to be immense, not least for the French city of Lille which finds itself at the centre of the London-Brussels-Paris triangle and at the hub of the high speed railway system for northern Europe. When new direct links are opened to Amsterdam, Cologne and Luxembourg, it will connect a region of 100 million people. Its railway system expects to serve 30 million passengers every year.

Thirty years ago, Lille was an historic city and important industrial centre, especially known for its textiles, engineering and coal mining. Its population was under 200,000. Today, its mines have closed and the textile mills are silent.

But a new European metropolis is in the making at Lille, with a 21st century approach to the city environment, not least in the way it is treating its urban transport and its waste.

Much of this has to do with the Mayor, Pierre Mauroy, who is not only a former French Prime Minister and close friend of President François Mitterand, but a Senator and President of the Lille Urban Community (CUDL). This is made up of 87 'communes' or urban districts, covering a metropolitan area of 644 km^2 with 1.2 million inhabitants. Together they have combined into a major force for planned change and development.

A regional campaign, led by Mauroy, persuaded French Railways to run its high speed channel link with Paris and Brussels through the centre of Lille, rather than outside it. A consortium of public and private backers, with Mauroy as chairman, then proceeded to build, in less than five years, a new Euralille commercial, conference and cultural centre around it. The TGV station, with its underground links to the city transport systems, and the adjoining Euralille was opened last year, in time to take the Channel Tunnel trains.

Environmentally, this development took advantage of an unusually large area of derelict land in the city centre which was once a military training ground, but more recently an ugly parking lot. This has now given way to the completed Euralille and to a 10-hectare (24-acre) city park which will be opened to the public later this year.

The driverless metro carries 45 million passengers a year.

MAX LEROUGE

Within Euralille, itself, as much space has been given to housing as to offices, as part of an overall policy to bring people close to their work. For those having to use their cars, 6,000 parking spaces have been built underneath the complex.

The adjoining old town, with its 17th century Spanish bourse and other fine buildings, has been turned into a pedestrianized conservation area. The 18th and 19th century facades have been preserved and cars have been banished into a parking area under the restored main square with its fountains, trees and statues.

But for most of Lille's inhabitants cars are not essential. The city has pioneered two public transport systems: a fully computerized underground metro which operates without drivers or guards, and an upgraded tramway system with raised platforms at every stop, allowing level entry for passengers including the elderly and infirm or those in wheelchairs.

The metro (or more exactly the Light Automated Vehicle) system has become the model for other cities in France and elsewhere, including Chicago, Taipei and Jacksonville. But it remains the largest LAV system in the world with 36 stations and over 45 million passengers a year. Four more stations are being opened in February this year and by 1999 the line will have been extended to the Belgian border.

Remarkably, the bus, tram and metro network is supplemented by a personal taxi service in the small outlying districts. For the price of a standard ticket (costing 7.50 francs, or about $1.40, for a ride of any length on any of the systems) a taxi from a local pool will take passengers to the nearest public transport stop. (Older people get a specially subsidized service on all public transport). The latest innovation is to introduce pollution-free buses running on methane gas from the city's sewage and water purification plants.

Indeed, in its handling of its waste, Lille is setting the pace for much of Europe. Its million people produce 600,000 tons of household waste each year, a figure growing by 3 per cent every year. And more and more of this rubbish is difficult to dispose of by traditional means: packaging, glass, cardboard and plastic.

Faced with this problem, rising charges for tipping into landfill sites, and three obsolete incinerators which could not handle the growing mountain of rubbish, the city had to do something.

"Local people woke up at last to the fact that their rubbish could no longer be exported elsewhere, and they did not want a new incinerator on their own doorstep," says André Gabet. An engineer and meteorologist by profession, and a long-time environmental campaigner, Gabet is now Director of Triselec-Lille, a joint venture company which runs the first of the city's two new rubbish recycling plants.

As he explains, there was no alternative but to develop a comprehensive management scheme involving everyone affected: industrialists, distributors, users, local politicians, salvage operators and recyclers.

Consultations and studies led in turn to an overall scheme summed up in the words: "throw away less, sort more, process better". The Urban District went into partnership with the national environmental organization Eco-Emballages, and agreed that Lille should become the pilot site for a major recycling programme.

Eco-Emballages is financed by a contribution paid on each pack by the packagers and makers of packs. In turn 100 local authorities have asked Eco-Emballages to process three-quarters of all packaging waste from some 15 million people over the next 10 years. Lille is in the forefront of this project.

As part of the partnership Eco-Emballages invests in the project, pays towards the cost of each ton sorted, finds customers for the recycled waste, guarantees its removal and helps in the local awareness campaign.

'Throwing away less' is the most difficult part of the operation, says Gabet. It involves lots of education, in the schools, through newsletters, exhibitions and public meetings, and by working with producers and distributors to agree on incentives and regulations to reduce the amount of packaging and encourage the use of recycled materials.

'Sorting more' led to various experiments in rubbish collection, ending in a two-bin system, which started in 10 pilot sites in 1991, and is now being extended to all 87 districts in the city. Each bin has two compartments. One, coloured green, takes bio-degradable waste and other items. The other, coloured orange, takes plastic bottles, glass and metal as well as paper, cardboard and cartons.

In the first of two recycling centres, at Halluin, in the north of the city, specially-built lorries bring in the rubbish in skips, already sorted by a system of bar coding and camera surveillance which makes sure that only material from the right bins goes into the right partition in the skip.

This then enters a football pitch-sized sorting centre where two categories of household waste are transformed, using new mechanical sorting mechanisms, into 16 recyclable products which emerge from the conveyer belts and blowing tubes to be pressed into bales of paper, cardboard, plastics of various types, plus various grades of glass and metal.

It is an impressive operation to watch, but one which is not entirely mechanized. Teams of 30 men and women, from the city's large pool of unemployed, are recruited to stand by the conveyor belts and help sort out "les indésirables" from the long line of sorted rubbish. They work at this for 20 hours a week, and are then provided with retraining for more skilled work for a further 20 hours.

Nor is there any difficulty in selling the finished product, says André Gabet. The steel and aluminium are taken by two companies who turn them into new tins, while some is recovered. for car parts. The glass is recylced for bottles and glass fibre. Paper and cartons are turned back into pulp for packaging, toilet and tissue paper and even furniture. The various types of plastic are re-used to make a range of products including pipes, floor covering, anoraks and carpets.

Halluin can treat about 60,000 tonnes of rubbish a year and produce about 45,000 tonnes of re-cycled materials. A second plant to be built in the south of the city will double that. This will still leave a need to have one incinerator, but its emissions will be fully filtered and provide a heat energy source.

Gabet's eyes light up as he describes the success of the Lille experiment, which is now being copied by 10 other French cities. "Germany, Sweden and Denmark have already got sorting centres", he says, "but Lille has the most advanced technology."

Calling himself "a Utopian realist" he sees no alternative but to expand the war on waste. "It is only since the first satellite in space that we have discovered that the earth is so small, so fragile and so limited in resources", he says.

"Without realizing it we are in the middle of a new industrial revolution in which recycling will slowly overtake new products. The idea of a 'laissez faire' system will go as everyone realizes that in order to save the planet we have to help ourselves." ■

F. DUVERNAY

F. DUVERNAY
MAX LE ROUGE

Facing page: *Sorting* les indésirables *at the Halluin recycling centre.*
Above: *Automated collection lorry outside the Halluin centre.*
Left: *Sorted waste is compressed and baled.*

The Buddhist, the businessman

Buddhist businessman Dhanapala Samarasekara has built a car factory like no other in the world – dedicated to hand-crafting body parts that will allow Morris Minors to keep on going. *Bishakha Datta* **travelled to Sri Lanka to meet him.**

It makes little sense at first. Why start a spare parts factory for a car that hasn't been manufactured for more than 20 years?

Because there are still 300,000 of these cars on the roads. Because if spare parts can shore them up, these Morris Minors will go on forever. And keeping these handy humpbacks going is one way of breaking the cycle of buying cars only to dump them a few years down the road.

"Broadly the idea is one of sustainable development," says Dhanapala Samarasekara, a retired Sri Lankan diplomat who started the Durable Car Company to make body parts for Morris Minors. "We cannot do away with transport. But we should use it in a meaningful way."

Samarasekara feels that current car production and consumption patterns are inherently wasteful. The lifetime of a car in the West is 7 to 10 years, he says, not because the car has outlived its purpose – but because "there are new innovations coming up. The manufacturer has to sell out the previous model." While the automobile industry calls this phenomenon 'planned obsolescence,' Samarasekara calls it what it is: a waste. "What a wastage of human effort it is," he says, with unusual vehemence, as he talks about his company.

Basking on the edge of a green Sri Lankan rice field, the Durable Car Company must be the only one of its kind on this planet. It was started in partnership with Charles Ware, an Englishman who has been concerned with the conservation of useful things since the early 1960s. He started restoring cars after a bankruptcy made him lose his Impressionist paintings and three luxury homes. "We were two idealists in a way," says soft-spoken Samarasekara.

While he oversees the factory, Ware markets the parts in England. This footloose collaboration allows Ware to give shape to his belief that cars – like houses – should be seen as permanent and conserved over a lifetime. Unlike modern cars, he argues that they can provide people with a means of getting from A to B at only a fraction of the depreciation and replacement costs of owning a 'high-tech' car with its built-in obsolescence. The partners also value the opportunity it gives to bring jobs to Sri Lanka. "Employment was one of my primary aims," says Samarasekara, whose factory employs 35 people, all recruited by verbally spreading the word in the high-unemployment area where he grew up.

The three-year old factory – located in an area where the Sri Lankan youth

Above: *Dhanapala Samarasekara with a Morris Minor.*

Right: *Inside the Durable Car Company factory.*

and the Morris Minor

revolt started – is itself a revolt against industrial convention. Traditional automobile factories are high-tech, computerized, even robotized operations. But the Durable Car Company looks like an airy shed, sounds like a giant kitchen, and is supported by ageing coconut palms that double up as pillars.

"The coconut trees were already there in my land," says Samarasekara. The rambling village house where he grew up – and indulged a boyhood passion for bee-keeping – stands bang in front of the factory. "The trees had come to the stage where they had outlived their economic life, and would have had to be replanted. So we re-used them."

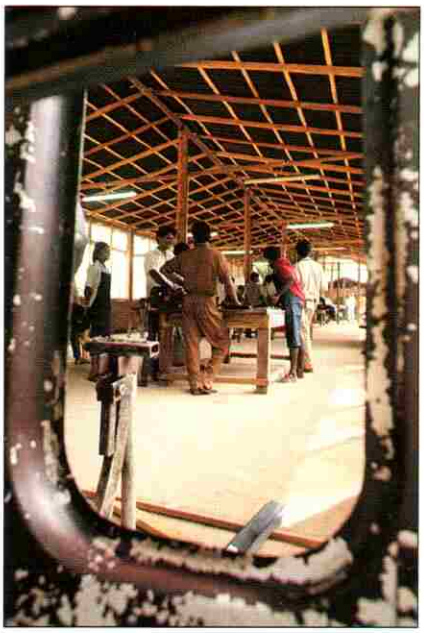
Such home-spun wisdom has allowed the factory to be built at a fraction of the cost estimated by a Colombo architect. "This should be a model for the types of factories built here," Samarasekara says, with quiet pride. "We used local materials that were already there."

Manufacture is similarly rooted in an abundant local resource – labour. "There is so much tinkering talent here," says Samarasekara. A labour-intensive method is ideal also because the limited monthly demand of 1,500 spare parts makes automation unviable. "Our handicraft approach allows us to take on small orders," says Samarasekara. Each finished product – moulded out of metal by hand – bears the proud emblem "Hand made in Sri Lanka."

The handicraft approach also allows workers to escape assembly-line drudge. "In the typical factory, the human being is made part of a machine," feels Samarasekara. At Durable, a worker is not a cog in the production process; he *is* the production process. "He doesn't feel he is doing a conveyor belt job. He innovates. He has really become a craftsman."

This transformation from worker to innovator is in keeping with the humble origins of the Morris Minor – which was designed by a man who tinkered his way from sweeping garage floors at William Morris to a position as a top mechanic. With it pleasant road manners, light steering, and low fuel consumption, the sturdy Minor soon became a car to swear by. Today, the car that was once called a "post-war poached egg on wheels," remains a cult classic.

For Samarasekara, the road to keeping a cult classic going has been an unusual one. Even so, he has managed to cart some of his personal beliefs along on the ride. Like Robert Pirsig who in his best-selling novel linked the art of motorcycle maintenance with



ALBAN DONOHOE

Zen, Samarasekara ties the philosophy of manufacturing with Buddhism.

"I believe in the Buddhist philosophy of following the middle path," he says, walking around the factory. A bunch of mechanics are hammering metal. He points to them. "There's no need to hammer the sheet for hours and hours just to say it's fully hand-made," he says. "That's ritualism." The way of the middle path? Use a machine where it saves time, advocates Samarasekara, who has written two books on Buddhism.

Such moderation also governs other arenas of Samarasekara's varied life. Like farming. This gentle Sri Lankan grows practically everything from pepper to passion fruit on his hillside farm. And although it is grown on organic principles, Samarasekara will throw in a little urea if needed. "I'm not a purist. I don't go for extremes," he says, crushing a fragrant clove leaf in his palm.

Extreme in his beliefs or not, Samarasekara's path through life does seem to have swung between polar opposites: Buddhism and Marxism, diplomacy and activism. The second son of an upper-class Sinhala family, he got involved in socialism at an early age. His Trotskyite connections proved profitable for his family tea-estate: they would receive advance warning everytime a labour strike was to cripple the neighbouring estates.

Growing up on a leafy tea-estate naturally led to concern for the environment – a concern that Samarasekara also attributes to Buddhist influences. "I firmly believe what Buddha said," he says as stars start peeping out from a velvet sky. "There is no dividing line between man, tree and mountain. So everything must be protected."

In line with this belief, he has recently became involved in an effort to protect a freshwater lagoon that can be seen from his farm. The view from the hilltop farm falls away in breathtaking layers of green, blue, green, blue: paddy fields, Koggala Lake, coconut palms, Indian Ocean. "But pollution from paddy cultivation is spoiling Koggala," says Samarasekara, whose daughter has done extensive doctoral research on pollution in the lake.

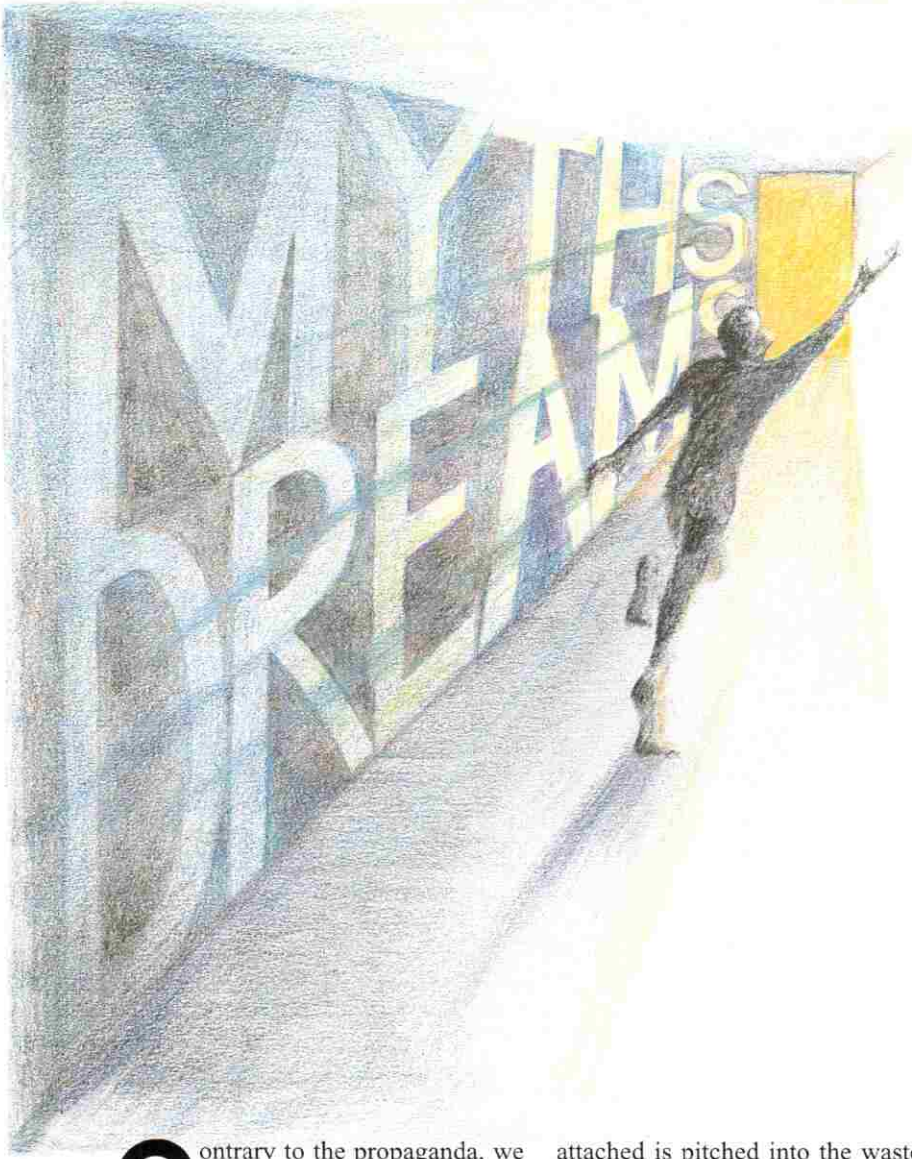
A heron swoops seamlessly into the lake as a boat rows us across to Vimuth, an island that Samarasekara hopes to turn into a vegetable sanctuary.

Koggala's silent waters are worlds apart from Durable's workshop – which sounds like a perennial kitchen protest of clanging pots and pans. Yet the 60-year-old Samarasekara spans the two worlds with amazing grace. He is as excited about the prospect of setting up a wetland research centre in a wetland area, as he is that his mechanics have finally mastered the mudguard. Koggala and Durable are one in his mind; they are the yin and yang of his search for a meaningful life. "I do not know the answer," he says. "But I will keep on searching." ■

Bishakha Datta is People & the Planet *correspondent in South Asia.*

Defending materialism

***Dr Peter Timmerman*, a leading Western Buddhist commentator, contributes the third in our series of cultural and spiritual insights – into what he calls 'the addiction of consumerism'.**



Contrary to the propaganda, we live in probably the least materialistic culture in history. If we cared about the things of the world, we would treat them quite differently – we would be concerned with their materiality. We would be interested in their beginnings and their ends, before and after they left our grasp.

As it is, what we are really consumed by are the dreams and myths temporarily attached to the objects around us; and when these dreams and myths wear off, the object to which they were attached is pitched into the waste bin. The consumer heads off again on the trail of the beckoning image of delight.

Your heart's desire

The strategy of consumerism is to get as close to your heart's desire as possible, and then get you to buy the nearest substitute. All those things that really matter – love, affection, respect, relationship – cannot be bought, and involve hard work. The consumerist trick is to penetrate almost to the centre of that primary heart energy, and to swerve aside at the last possible second into a purchaseable substitute.

This propulsion and relaxation into shopping is a potent confusion, and the trick is pulled everywhere by marketers in high buildings in the middle of large cities. Commercials are not about food or shelter or getting from point A to point B: they are visions of dessert as sexual ecstasy, basketball sneakers as the wings of Mercury, automobile hoods as the playing of light over the sensuous curves of a woman's body. Better telephone service magically transforms the relationships of grandparents and children; a beer waved around generates balloon flights, hearty chums, and clinging starlets.

To break this deeply addictive cycle of beckoning and frustration, we may find a little assistance in some of the world's spiritual traditions. A number of these traditions have rituals of carefulness and mindfulness, which are designed to focus the attention on things as they are. This is sometimes referred to as the Way or the Dharma: the graininess of the world as it is. What mindfulness or pure attentiveness is designed to do is to break the grip of instant generalization, rigid categorization and the gluey blurriness of desire.

In mindfulness, one is sometimes asked to watch one's own breathing, or walk deliberately. One may be assigned ordinary tasks like washing dishes, cooking food, or sweeping rooms. Each of these tasks is to be followed with absolute mental faithfulness, without swerving aside into descriptions of what is going on, or listening to the increasing impatience of a mind bent on doing something – anything – else.

An opening to the world

Almost inevitably and immediately when these practices are followed, the rich particularity of the experience or the object begins to show itself. The silent presence of things as they are comes to our attention. The 13th century Japanese Zen Buddhist master Dogen said: "To move forward to penetrate all things is illusion; to allow all things to move forward to penetrate you is enlightenment".

This refusal to grab at things, to manipulate them for one's own ends, to act violently towards the world – suddenly opens them up like one of Van Gogh's Sunflowers. As they open up, they also begin to reveal their connectedness and causal relationships to other things and their surroundings. Speed and selfishness seem to pull us and other things out of context: slowing

down and unselfing reintegrates.

The reference to Van Gogh's Sunflowers is no accident. It has been a task of the artist for a long time to see the world in a grain of sand, as Blake put it. John Keats referred to this as "negative capability": the capacity of the artist to be so self-effacing that personal expression becomes the vehicle for the universe to re-present itself through the artist's willing hands, eyes, mouth. At such exalted times, "the spirit moved me", "I was taken out of myself", "I was in the hands of a higher power."

Abundance and scarcity

This openness to the abundant gift of the world as it is, is complicated in our society by the fact that our current world view is based on a belief in the fundamental scarcity of Nature. Traditional cultures have always believed that the world is fundamentally abundant – "God will provide" – even though there are occasional scarcities, usually caused by human transgression of sacred rules. These rules, like the rules of the hunt among the Cree of Northern Canada, are set by the animals or the gods, and they are founded on the principle that gifts (like the gift of an animal to a hunter) must be respected, and waste is a sign of deep disrespect.

By contrast, Western society draws upon the Protestant tradition that Nature must be laboured with if she is to produce; and on the more recent theories of economists that scarcity is endemic to our condition, and human beings are necessarily always having to choose how to ration their resources. Nature is therefore in need of development, and economic man is driven to generate a man-made abundance to make up for the supposed stinginess of the physical world.

This desperate need to produce (and to consume) is driven by a kind of panic and mistrust, because it is an attempt to fill a yawning gap in existence with an endless stream of glittering objects. Waste is the dark side of this: the yawning disposal site, filled with an endless stream of objects from which the momentary magic of man-made abundance has fled. And, like a self-fulfilling prophecy, the human creation of pseudo-abundance is in fact causing the rest of the world to become scarce.

Poverty and frugality

Poverty has always been pivotal to discussions of material well-being, consumerism, and waste. Because they have little choice, poor people who have not become utterly degraded and destitute are necessarily frugal. Members of my parent's generation who lived through the Great Depression are well known to be the backbone of household recycling.

Voluntary poverty as practised by St Francis and others is designed to strip away possessions, which then in turn strips away familiar hierarchies and categories, and forces attention to be paid to the abundance of what is given freely by God and the compassion of others.

Here again, humble attentiveness to simple things can result in the discovery of untold wealth lying around everywhere; and with the breaking down of the barrier of possessions, there can also emerge a new awareness of the community of all beings as so famously expressed by St Francis in his Song of the Creation. St Francis (like Jesus before him) discovered that "voluntary poverty" is the gamble on an original abundance, on taking no thought for the morrow, on throwing oneself into the hands of God. Thus carefulness can also ironically lead to carefreeness.

On the other hand, years of grinding involuntary poverty make people long for the chance to splurge. Endlessly having to get dinner on the table or the eternal scrounging to make ends meet ironically means that objects have become too closely associated with suffering, and it requires a restaurant meal or new clothes to make one fully appreciate the wonderfulness of things. Splurging does not have to be squandering; and occasional heedless abandon does not have to mean wanton wastefulness. Even the poorest society has to have its times for dancing in the street.

Problems and mysteries

Wanton waste is throwing things over one's shoulder and moving on without looking back, just as our society is always looking longingly towards new "developments" over the horizon, far away from the barren waste of the world we have already made. Mindfulness requires not only that we look at the richness unfolding where we already are, but also remember that, given a finite planet, there is no "away" to throw things any more.

The French philosopher, Gabriel Marcel, once made a distinction between "problems" and "mysteries". "Problems" (from the Greek, "problemata", meaning "thrown in front of") are externalized difficulties, which we solve – if we can – by confronting and breaking them open like walnuts and tossing them aside when completed. "Mysteries", on the other hand, are problems that cannot be externalized, that are so intimately tied up with our being that we cannot stand far enough back from them to treat them "objectively". A mystery involves, entangles, even engulfs. The deeper one enters into a mystery, the deeper it enters into you. Other people have "problem children"; one's own brood are irritating, endless mysteries that inevitably reflect on you!

We have for a long time seen our relationship with the rest of the world, with Nature, as a problem to be solved; and as a result, Nature has been objectified, silenced, and externalized. Or perhaps, as with the animals of the hunt, Nature has withdrawn into her shell in disgust. Consumerism, which tries to solve love with sex and liberation with automobiles, is one solution to the resultant impoverishment; 24 hour media babbling is a similarly demented solution to the terrible silence of a world filling up with nothing but human noise.

Now, however, the global crisis we face is beginning to force us into acknowledging that we are inescapably part of a mystery. We cannot step back from the world, we are inextricably bound up in its fate. Until recently, waste and waste management were mere problems. But on a bounded and finite planet, the destiny of every sheet of paper on my desk is linked to my own destiny. It is within the tightening circle of concern.

It is tiresome, but true. We are stuck with a mystery, the often unwanted burden of now having to pay constant attention to the next steps of the objects around us. How will you ultimately deal with this issue of *People & the Planet* you are holding in your hands?

Nevertheless, it is not always a wearisome task, an endless stream of newspaper tying, bottlewashing, and sewer construction. It can, as already mentioned, be a mindful task. A Buddhist phrase puts it this way: "Sometimes, when we look down into the abyss of mystery, the unfathomable rises to greet us". ■

Dr Peter Timmerman is Director of the Institute for Environmental Studies at the University of Toronto

Old values, new lifestyles

by Karen Christensen

The vaunted benefits of the rich consumer society are choice, variety and personal freedom. We in the northeast of the United States can eat fresh pineapple in February and move from air-conditioned offices to air-conditioned cars in the summer.

What we forget is the things we cannot do, the things we no longer have available because of the choices and demands of our consumer society.

We cannot see the stars as our ancestors did, or drink from a mountain stream. We cannot buy really tasty ears of corn to eat with sweet local butter in August, because all the farmers have switched to a bland variety that keeps its sweetness for city markets. Our children cannot play on the streets in safety, or walk to school by themselves.

The solution has to start with an analysis of the reasons for rampant consumerism. The simple reason is that companies and nations can only get rich when people buy more of what they make. But on a personal level, the influences that increase consumerism around the world are mass media and advertising, the speed of technological innovation, and the social insecurity that results from broken family and community ties.

Faced with this realization, there is a growing interest in old-fashioned thrift. "Use it up, wear it out, make it do, or do without" is an old New England saying which was a comfort to many people scaling back their lives in the recession of the early 1990s.

Some people are simplifying their lives, choosing simpler homes, simpler meals, simpler clothes, and simpler holidays. This goes with a reconsideration of the things we value, and thought about the limits to our time and energy. The frantic pace of urban life is leading many people, especially parents of young children, to choose to move to smaller towns where they can lead a more balanced life, with time for family, friends, and themselves.

Beyond this, environmental and religious organizations are encouraging members to think of 'living simply that others may simply live.'

Many people are rethinking consumerist values. Most parents want their children to grow up with a sense of values that depends on something other than brand names, and they are frightened by what they see in their culture.

Since our primary satisfactions in life come from relationships with families and friends, the more time we have to enjoy these relationships, and the more our lives are structured to foster stable human connections, the less likely we are to compulsively buy, or to buy for status.

Building a sense of community, whether a neighbourhood, an apartment building or a city block, reduces consumption. People consume more when their lives are very much individualized, where tools and equipment are not shared, where clothes are not passed to younger children in other families, where entertainment has to be purchased.

There is a growing awareness, especially in the United States where the problem is most intense, that there needs to be restrictions on advertising. In Washington DC, the Centre for the Study of Commercialism has promoted, with the help of religious leaders, a coalition to protest the commercialization of Christmas. The feminist magazine *Ms* was relaunched in 1990 as ad-free, with astonishing success.

Exchange and trade are not going to disappear, and no one will make a living if other people are not willing to buy their goods or services. But in order to preserve strong communities, especially in rural areas, residents need to keep money in the local economy in order to encourage a sufficient diversity of services. This is green consumerism, making sure that the money we spend supports businesses we want and the people who run them.

There is a middle ground between the wealth of a few countries and the poverty of others.

Ever since human beings began to live in settlements they have acquired and stored material goods – food, first and foremost – but the other things too. But the acquisition and storage (not to mention the insuring, guarding, repair and replacement) of material goods need not overwhelm all other human pursuits.

It seems likely that the environmental pressures that are provoking such debate about worldwide consumption patterns will lead to a closer look at the conflict between human and corporate aspirations, and at the factors that make for healthy, happy, and sustainable human societies. ■

Karen Christensen is author of The Green Home *(Piatkus, £9.99) and is working on a new book,* A Smaller Circle: Search for Community.

Associates' NEWS

Resource files

The World Conservation Union (IUCN) has introduced a new information service in the form of *Resource Files* about its work on critical environmental issues and threatened ecosystems.

In a jargon-free, clear and informative style, each File includes a Briefing Paper, Feature Report, maps and photographs. Environmental data is set against the social, political and ecological history of the lands and seas under review. Three issues have so far been produced – on Water and Wetlands Management in Africa, Capacity Building in Asia and the Pacific, and Coast Management in the Arabian Peninsula.

The *Resource Files* are a mine of information and clarify many areas of contemporary interest. Describing the environment of the Arabian Peninsula, for example, a case study assesses the effects of the Gulf War on the marine environment. It summarizes the efforts made so far to chart species and habitat loss and the measures taken to limit the damage of the oil slicks. The riches of the Gulf, formerly assumed to be mainly oil but in reality including many rare species and fish of commercial importance, have been uncovered in the war's aftermath, as has the threat to the whole area of modern 'tanker alley' commerce.

The *Resource Files* are intended for IUCN members, government bodies, the development assistance community and the media.

■ *Contact: John Burke, Director of Communications and Corporate Relations, IUCN, Gland, Switzerland.*

Barrier methods

Family Health International (FHI) has just published *Modern Barrier Methods: Effective Contraception and Disease Prevention*, a 64-page book for health care providers and family planning managers on the safety, effectiveness and acceptability of barrier methods.

It is an easy-to-read, comprehensive guide that examines scientific research findings and explores programmatic issues related to barrier use. Written by Paul Feldblum and Carol Joanis of FHI, it is available at no cost upon written request from developing country agencies and individuals, and costs £13.95 for others.

■ *Contact: Publications Co-ordinator, FHI, PO Box 13950, Research Triangle Park, NC 27709, USA. Fax: +1-919 544 7261.*

Last chance for the tiger

The World Wide Fund for Nature (WWF) has issued a warning that the illegal trade in tiger bone for Asian medicine threatens tigers with imminent extinction in the wild.

In the first-ever report on the global tiger trade, WWF's wildlife trade monitoring programme, TRAFFIC, reveals that there are as few as 5,000 tigers left worldwide. Their decline can largely be attributed to poaching to satisfy the tiger bone market.

Tiger bone is consumed by Asian communities all over the world, including Canada and the United States.

Tiger bone is most often prescribed to ease rheumatism but is also used to treat a host of other ailments from headaches to back pain.

In an effort to end the illegal trade in tiger parts, WWF is urging relevant governments to step up enforcement, implement higher penalties and improve domestic legislation. Awareness campaigns have also been introduced to dissuade consumers from using tiger bone. Further research into substitute medicines and co-operation through the newly formed Global Tiger Forum are also recommended.

"The situation is desperate," said WWF's Dr Simon Lyster. "Without drastic measures in both tiger range states and the consumer countries which import tiger products, the tiger is doomed to extinction."

■ *For copies of* Killed for a Cure: A Review of the Worldwide Trade in Tiger Bone *or further information contact Christina Yin at WWF International +41-22 364 9576 or Bobbie Jo Kelso at TRAFFIC International +44-1223 277427.*

MARTIN HARVEY/WWF

Indian tiger in a Bangkok zoo.

Seminars

The International Union for the Scientific Study of Population (IUSSP) is holding two Seminars later this year.

The first, on Intergenerational Economic Relations and Demographic Change, co-sponsored by the East-West Centre Programme on Population, will be held in Hawaii from 12-15 September. It will focus on a various economic issues in relation to the changing age structure in the North and South.

The second, on Male Fertility in the Era of Fertility Reduction, will be held in Mexico from 7-10 November. This seminar will explore the fertility goals and behaviour of men.

The 23rd IUSSP general conference will be held in China in 1997.

■ *Hawaii seminar: contact Frances Jans, IUSSP, 34, rue des Augustins, 4000 Liege, Belgium. Fax: +32-41 223 847. Mexico Seminar and China conference: contact Bruno Remiche, IUSSP, same address and fax number.*

Mexico expands vasectomy services

Vasectomy was not a major contraceptive method in Mexico's family planning programme until 1989, when the Instituto Mexicano del Seguro Social (IMSS), Mexico's largest provider of health and family planning services, adopted a new strategy to improve its availability and use.

The number of vasectomies performed in IMSS facilities rose from 6,283 in 1989 to 16,882 by 1993. IMSS now provides more vasectomies than any other institution in Latin America.

To expand vasectomy services, IMSS has simplified medical services, reduced the cost of performing the procedure, and is providing services at the lowest level in the system where they can be safely performed. IMSS employs the no-scalpel vasectomy as the standard technique.

The IMSS programme

proves that strong leadership is crucial to the expansion and use of vasectomy services. Hopefully, it will serve as a model not only in Mexico, but in other countries now planning the development of vasectomy services.

■ *The IMSS programme is supported by AVSC International. Contact, AVSC International, 79 Madison Avenue, New York, NY 10017. Fax +1-212 779 9439.*

Modelling the future

The Environmental Management Bureau of the Department of Environment and Natural Resources (DENR) in the Philippines has completed a series of one national and eight regional workshops on population and environment.

Over 500 participants attended the seminars and ranged from high-level policy makers to representatives of NGOs, academics and local government officials.

The Philippines activity is one of several similar country-level activities that have been or are being implemented with technical assistance from the Futures Group International.

FUTURES has participated in similar activities in Madagascar, Costa Rica and Rwanda, and is currently working on a project that aims to illustrate the impact of fertilizer and wood energy use strategies on the environment in selected areas of Africa.

■ *Contact: John Freymann. The Futures Group International, Inc., 1050 17th Street NW, Washington, DC 20036, USA.*

PAI on Internet

Population Action International is now on the Internet, on which it is offering electronic tests of its Population and Environment Programme publications.

The files, available for downloading, do not include graphics, data tables and endnotes which are available in the publications, but they do contain the complete texts of the reports *Challenging the Planet: Connections Between Population and the Environment* and *Sustaining Water: Population and the Future of Renewable Water Supplies.*

Also available are various press releases and information about PAI. More reports will be posted on the Internet as their electronic texts become available. To find PAI on the Internet type gopher gopher.igc.org, then select "other organizations" from the first menu, then select "Population Action International" from the second.

Sustainable climate

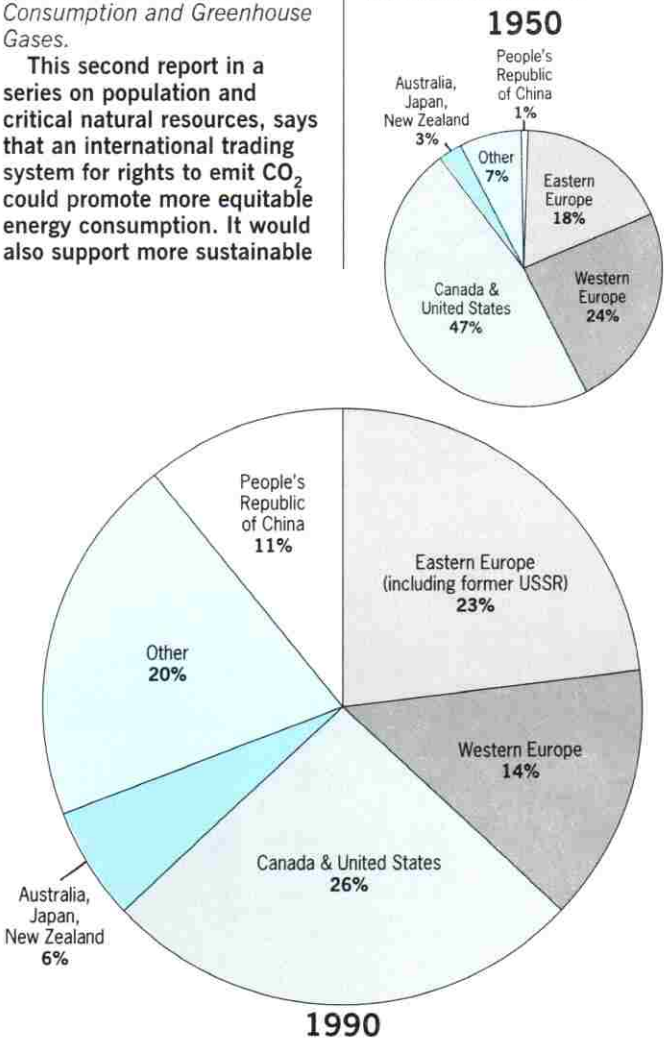
Stopping human-induced climate change will require greater efforts to stabilize world population as well as dramatic cuts in emissions of heat-trapping carbon dioxide, according to a new report by Population Action International, *Stabilizing the Atmosphere: Population, Consumption and Greenhouse Gases.*

This second report in a series on population and critical natural resources, says that an international trading system for rights to emit CO_2 could promote more equitable energy consumption. It would also support more sustainable forms of development, while moving the world towards a more stable atmosphere and climate.

Such a system would have a greater chance of success if world population size stabilizes at a level not too much higher than today's, the report concludes.

Written by Robert Engelman, Director of PAI's population and environment programme, the report includes a detachable colour chart that ranks countries by their 1990 per capita emissions of industrial carbon dioxide. The chart separates countries on the basis of whether or not they are "climate sustainable" – not contributing to current alteration of the greenhouse effect on the basis of these per capita emissions.

■ *Copies from PAI, 1120 19th Street NW, Suite 550, Washington DC 20036, USA. Tel: +1-202 659-1833, Fax: (202) 293-1795. Email: pubinquiry@popact.org.*



Carbon dioxide emissions by region, 1950 and 1990.

Women and Islam

A new Population Council booklet, *Family, Gender and Population Policy: Views from the Middle East*, written by Jodi Jacobson, questions some common beliefs about women in Islamic societies.

Contrary to popular assumptions, it argues that many aspects of the Islamic ethic are essentially egalitarian. It is the interpretation of this ethic by some governments and clerics, rather than the Islamic texts themselves, that has undermined women's status in the Middle East.

Research also finds that among those Middle Eastern countries seeking to reduce their population, combining broad development efforts with access to family planning services has proven successful. But to be effective, family planning needs to be rooted in a framework of reproductive health care.

This booklet highlights these issues and other new research by Middle Eastern scholars first presented at a Council-sponsored symposium in Cairo in February 1994. A collection of the papers presented at the symposium were published as a book late last year.

■ *For a copy of the booklet and/or book contact, The Population Council (USA), One Dag Hammarskjold Plaza, New York, New York 10017, Office of Publications, Circulation Department. Tel: +1-212 339 0514; Fax: 212 755 6052.*

Best journal

Network, a USAID-supported quarterly health bulletin published by Family Health International (FHI), has been named 'Best Population Journal' in the 1994 Global Media Awards for Excellence in Population Reporting.

Network reaches 65,000 subscribers in English, French and Spanish, and an additional 20,000 in Russian.

The Global Media Awards, are sponsored by the Population Institute

■ *For further information, contact Nash Herndon, Managing Editor, FHI, PO Box 13950, Research Triangle Park, NC 27709, USA. Telephone: +1-919 544-7040.*

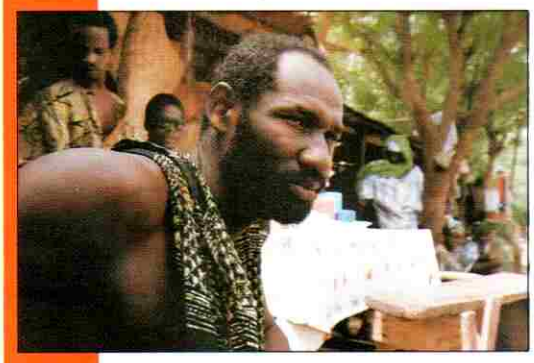
FILMS

Taxi to a foreign land

People, population and migration – buzzwords in the lead up to the International Conference on Population and Development in Cairo this September – were also central themes of *Developing Stories II*, a four-part series made by film-makers from Haiti, Palestine, India and Mozambique.

Timed to be shown to decision makers and planners at Cairo, the TVE/BBC-inspired Developing Stories series is now being distributed by TVE free of charge to broadcasters, non-governmental organizations and schools throughout the South.

Picking up the baton, and telling the story of economic migration from dusty Mali to the affluent nations of the North, is Faction Films' critically acclaimed *Taxi to Timbuktu*. Part-funded by TVE and shown recently on Channel Four, the film focuses on the



life of Alpha Gassama, a taxi driver in New York City. When he arrived in the city he fell in love with the limousines and *had* to learn how to drive.

Day and night he crosses the city keeping out of trouble, dodging guns, traffic jams and stroppy passengers. Last year 47 drivers, mainly Africans, were murdered. "Where are you from?" asks a fare. "M-A-L-I...that's Mali. The country is very poor and very dry so we come here, make some money and send it back to the family."

It's not just New York which lures the men from Batama, Alpha Gassama's home village. They also go to France in search of work. But like the United States, which once welcomed the world's downtrodden, the country does not want them any more. Where next? To the laundries and construction sites of Japan? Or home "where you have the freedom of heart, freedom of spirit," but no future? *Taxi to Timbuktu* sheds light on the dilemma faced by people who straddle world's of barely imaginable contrast.

Taxi to Timbuktu*: contact Faction Films, 28-29 Great Sutton Street, London EC1V 0DU, UK. Tel: 071 608 0654, Fax: 608 2157. Inquiries from developing countries should be addressed to TVE, Distribution and Training Centre, Postbus 7, NL-3700 AA Zeist, The Netherlands. Tel: +31 3404 20499, Fax: 22484.* Developing Stories II*: contact TVE, The Netherlands as shown.*

Film Trilogy

Can a girl-child from a poverty-stricken family get an education in Indonesia? The education of daughters is the theme of a new television drama trilogy by one of Indonesia's foremost directors, Teguh Karya. Scheduled for national broadcast in December 1994, *Alang-Alang* ("Wild Grass") depicts a young girl persevering through life in search of education.

Born in the slums of Jakarta, Syarifah struggles to better herself through education. When her mother dies and her father remarries, she struggles through all the hurdles of getting educated. Told as a series of reflections on her life, *Alang-Alang* is Syarifah's story, a tale of perseverance, faith and the role of tolerance and mutual support within the family.

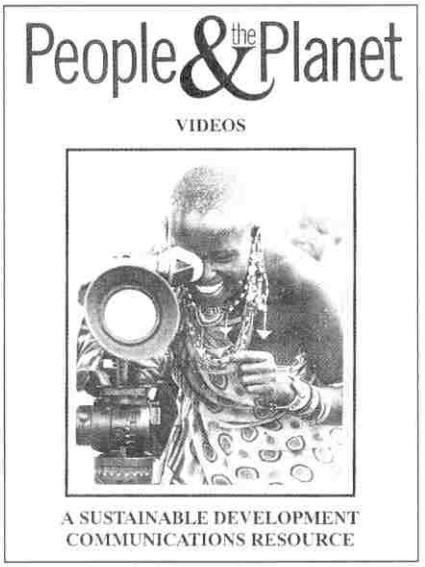
Alang-Alang Director Teguh Karya has been a prominent figure in Indonesia's theatre and film community since the 1950s. Considered one of the country's top dramatic directors, in *Alang-Alang* Mr Karya draws a compelling story of a family struggling against the pressures of poverty. The drama promotes the education of girls within the Muslim context of Indonesian society. It reflects Indonesia's broader family welfare approach.

Indonesia's State Ministry for Population founded the project with World Bank funds and two Indonesian production houses co-produced the three-part, 126-minute drama. Johns Hopkins University Population Communication Services (JHU/PCS) provided technical assistance by making available Teguh Karya's expertise and assisting in story development and research.

■ *Contact: JHU/PCS, Fax: +1-410 659-6266.*

People & the Planet Videos

Spring 1995 will see the launch of a new *People & the Planet* venture: the *People & the Planet Videos* project. Working closely with the specialist British documentary producer, North South Productions, Planet 21 is going into the video business, to help meet a need for up-to-date, low-cost video information on successful sustainable development initiatives.



Each quarter, a new video magazine will be released on a particular theme, linked wherever possible to the content of *People & the Planet* print magazine. A pilot programme is already in production on the theme of the Cairo Action Plan on population and development, focusing on success stories in Egypt and Colombia.

The videos will be produced in collaboration with local South-based production companies, with research backing from the International Institute for Environment and Development. They will be available in English, Spanish and French, and in 'kit' form, so that local language versions can be made. Each version will feature a presenter from the South, and two case-study stories, with a bias towards community-based solutions. The target audience are decision-makers, NGOs and TV stations in the South, and NGOs, TV stations and educational institutions in the North.

Distribution of the videos will be via TVE, the Television Trust for the Environment, who will also be playing a key role in helping to identify production partners in the developing world. ■

BOOKS

Women alone

My Children, My Gold: Meetings with Women of the Fourth World
Debbie Taylor
Virago Press, London 1994, £6.99

This is not just another book on poverty and patriarchy. By her dogged insistence of going where few bother to go, spending the time few bother to spend, and weaving her personal reactions into the tales of her hosts lives, Debbie Taylor has given us very special insights into the reality of single mothers lives.

The fourth world, says Taylor, is the world of women-headed households. Where this phenomenon was once the result of widowhood only, we are now seeing an increase in wives – most of whom are also mothers – abandoned by feckless husbands. In my view we should not even use the term, women-headed households but rather the more reality-based term of male-abandoned households.

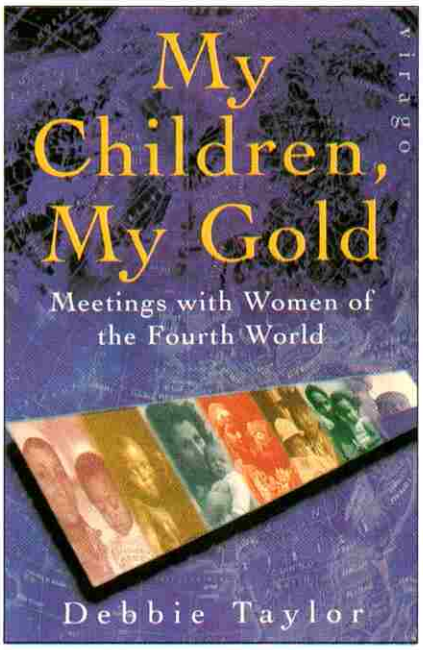
When abandoned by the fathers of their children, women share common burdens whether they live in poverty or affluence. This is what Taylor so brilliantly documents. Single motherhood is not a result of poverty or some failure on the part of women; it is the result of declining male responsibility. And, in every society, to be without a man is to be dismissed, disinherited and to endure disrespect.

With the exception of two widows, the mothers visited by the author describe, with remarkably little bitterness, the repercussions of that abandonment. Indeed, as Taylor points out in her introduction, "Where men have proved themselves unreliable partners, women are beginning to discount them from their families. To start with, this often feels like a tragedy. But in time, many single mothers discover new strength and new rewards in their independent lives."

Those lives are described in warm and candid detail. The smells, sounds and tastes of each setting are vividly portrayed by the author who spent seven days with each of her subjects. She literally lived with each woman for a full week, listening to stories of struggle or simply observing the tasks and turmoil of daily life. For the reader who has not visited an Indian village, the time spent in Jomuna's home and the observation of her survival strategies, as described by the author, will provide an understanding of the lives of countless women in such villages.

Maria, the Brazilian prostitute, who shares every scrap of bread, beef fat and human compassion with an extended support group of family, friends and lovers in the drought stricken Northeast, speaks matter-of-factly about women's plight and their commitment to children, their own and those of others.

In affluent Australia, Helen has no life of her own; she works, shops, teaches,



chauffeurs, cajoles and mothers. Her former husband chose to leave her and his children and reside with a younger women. He indulges his child-rearing ego only when it is convenient for him to do so.

Amal, the thrice-divorced Egyptian woman, is virtually imprisoned in a tiny apartment with two adolescent daughters so that no doubt can be cast on their virginity. For me, this was the most heart-wrenching portrait. To be woman is to be dependent on a man; when the man abandons you, there is little protection from exploitation, poverty or, in this case, the destruction of one's only pride, the reputation of being an honest woman.

Part travelogue, part diary, *My Children, My Gold* is poignant testimony of what it is like to be woman and mother without a man. Women will read it and shake their head knowingly. Men who read it will never be the same.

Perdita Huston

Perdita Huston is currently preparing a UN-sponsored book of conversations with families in 12 countries in support of the International Year of the Family, to be published in Spring 1995. Research for *My Children, My Gold* was funded by Planet 21, in association with the Swedish International Development Authority.

Managing coastal zones

Coastal Zone Space – Prelude to Conflict?
Edward D Goldberg
UNESCO, Paris, 1994. Frs.85.00

Collaborative and Community-Based Management of Coral Reefs – Lessons from experience
Alan White, Lynne Hale, Yves Renard and Lafcadio Cortesi
Kumarian Press, West Hartford, Connecticut, 1994. $21.95

For anyone who knows about the plight of the world's coastal areas, the title of the first book – *Coastal Zone Space – Prelude to Conflict?*, is an oxymoron. There is no prelude. Coastal zones are already embroiled in every conceivable form of conflict. Nearly two-thirds of humanity already lives on the coast or within 150 km of one, and future population growth is set to explode in coastal areas in the South. By the year 2025, coastal zones could contain nearly 75 per cent of the world's people, or 6.4 billion.

Over the past 40 years, vital coastal resources, such as estuaries, salt marshes, mangrove forests, seagrass beds and coral reefs have been shamelessly plundered in the name of development. Fisheries have been devastated, by lack of proper management and over-harvesting.

The author, a professor of chemistry at Scripps Institution of Oceanography opens the book well with a review of population pressure on coastal zones – and ends it well. But the middle suffers from the effort to cover too much ground in too little space.

The second book draws on the authors' valuable experiences of "hands-on management" of coral reefs, the marine equivalents of tropical rainforests. Coral reefs are treasure troves of biodiversity, yet they may be disappearing faster than tropical rainforests. So it is with some urgency that the editors present the case for saving what remains of these highly fecund ecosystems.

This book is well thought out with concise analysis of the issues. But its main value is in its well documented case studies of how coral reefs in different parts of the world, suffering from various human impacts, have actually been managed, with varying degrees of success.

Don Hinrichsen

Don Hinrichsen is a Contributing Editor of *People & the Planet* and author of the forthcoming publication *Living on the Edge: Coasts in Crisis*, to be published by Island Press, USA, 1995.